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QUALITY ASSURANCE PROJECT PLAN

SITE PREPARATION AND MATERIAL REMOVAL

FINAL DESIGN
ENVIRO-CHEM SUPERFUND SITE
ZIONSVILLE, INDIANA

Prepared For:

ENVIRONMENTAL CONSERVATION AND CHEMICAL CORPORATION TRUST

Prepared By:

AWD TECHNOLOGIES, INC.
INDIANAPOLIS, INDIANA

AWD PROJECT NUMBER 2259

MAY 1993

NOTICE

This document is a portion of the overall design package and, therefore, cannot be referenced, in whole or in part, as a standalone document for any other purpose.

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APPROVALS:	DATE:
______________________ ECC TRUST'S REPRESENTATIVE (PRP) (OPTIONAL)	____________
______________________ REMEDIAL CONTRACTOR PROJECT MANAGER	____________
______________________ INDEPENDENT CONSTRUCTION QUALITY ASSURANCE OFFICER	____________
______________________ U.S. EPA REGION V, REMEDIAL PROJECT MANAGER	____________
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______________________ IDEM PROJECT COORDINATOR	____________

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1.0 PROJECT DESCRIPTION

1.1 Introduction

This Quality Assurance Project Plan (QAPP) has been developed to cover all anticipated chemical and physical parameter testing which will be conducted during the ECC Site Preparation and Material Removal phase of the Remedial Action at the Environmental Conservation and Chemical Corporation Site (ECC Site), located in Zionsville, Indiana.

ERM-North Central has previously submitted a number of versions of a two-part Sampling and Analysis Plan for the ECC Site which contained a Part I - Field Sampling Plan and a Part II - Quality Assurance Project Plan. The Sampling and Analysis Plan addressed site preparation, material removal and remedial action activities, although the plan primarily focused on remedial action activities.

The previous ERM-North Central submittals of the Sampling and Analysis Plans and the corresponding U.S. EPA Region V comments are as follows:

1. Sampling and Analysis Plan, Revision 0, March 1, 1989
2. Sampling and Analysis Plan, Revision 1, December 10, 1991
3. U.S. EPA Region V Comments on Revision 1, February 21, 1992
4. Sampling and Analysis Plan, Revision 2, March 24, 1992

AWD Technologies, Inc. (AWD) has revised the ERM-North Central Sampling and Analysis Plan, Revision 2, to further address the U.S. EPA comments. The previous Sampling and Analysis Plan two-part format has been modified to include the Field Sampling Plan within the Quality Assurance Project Plan. The Sampling and Analysis Plan terminology is not used in the AWD plans.

The Final Design for the ECC Site has been further modified to include two design packages: (1) Site Preparation and Material Removal and (2) Remedial Action. The Site Preparation and Material Removal phase includes preparation of the support zone and removal of above ground tanks, buildings, and miscellaneous debris. The Remedial Action phase includes in-situ soil treatment by soil vapor extraction, capping of the soil treatment area, and verification and compliance monitoring.

The Site Preparation and Material Removal phase includes the following:

- Preparation of a site support zone which will consist of facilities to support the material removal efforts and subsequent corrective actions; placement of temporary controls; and design and layout of ingress, egress (personnel and traffic), and material handling and storage areas.

- Remove physical obstructions including tanks, buildings, debris, and any other above ground obstructions prior to initiation of Remedial Action Phase 2 construction.

Sampling and analyses will be performed on selected materials for removal based on visual classifications, field screening, and RCRA waste characterization.

The intended use of all data collected during this phase is to provide sufficient analytical results and/or approval on all material removal items to satisfy acceptance criteria of appropriate disposal facilities. Schedules for submittal of samples depends on the matrix in question and is covered in the following applicable sections. Some sampling will be required early to achieve agency approvals and facility acceptance, while other sampling will be required on an as-needed/recognized basis.

1.1.1 Site Location

The ECC Site is located in a rural area of Boone County, about 5 miles north of Zionsville and 10 miles northwest of Indianapolis, Indiana (Figures 1-1 and 1-2).

1.1.2 Site Description

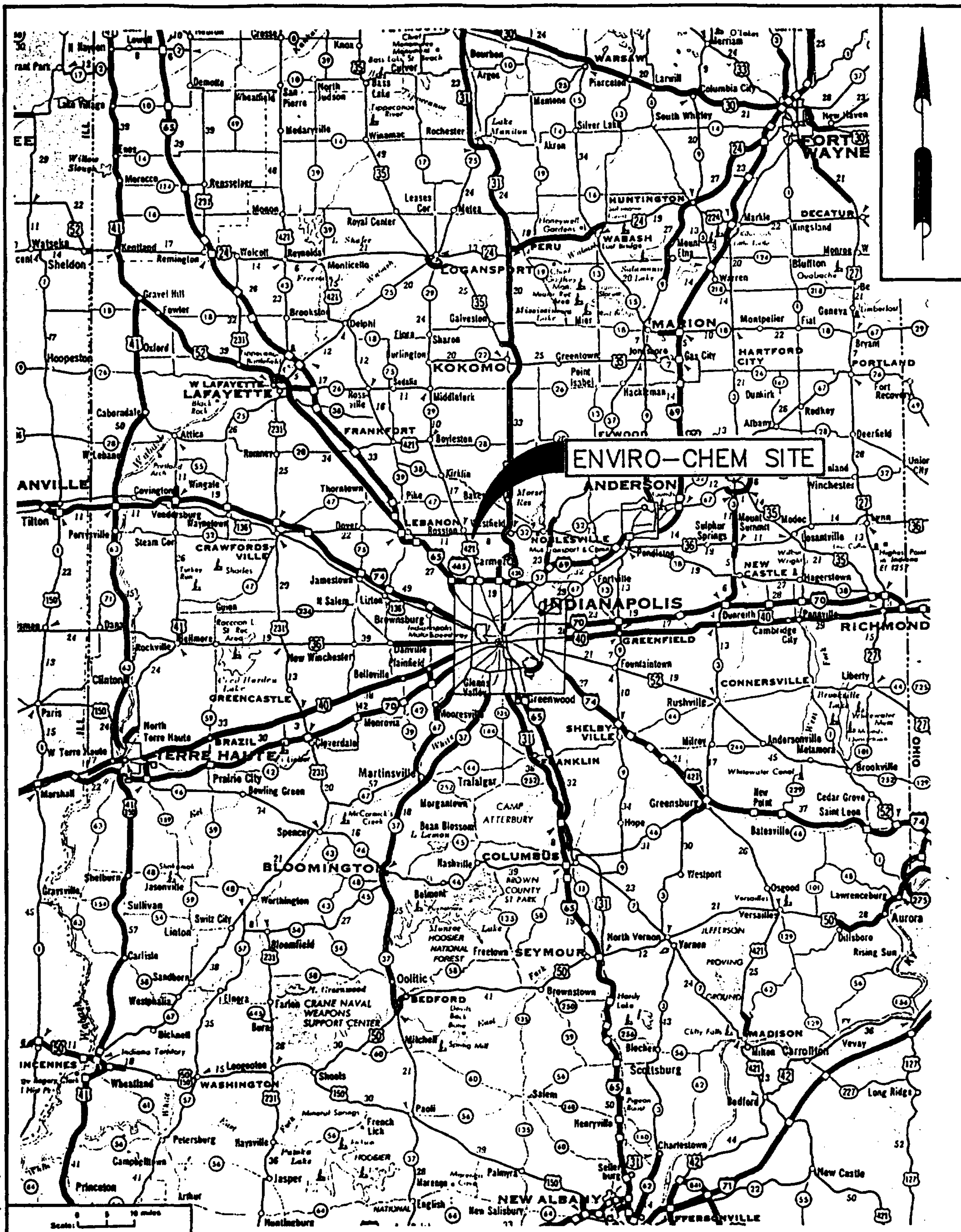
The Site is defined as the area bounded by the proposed perimeter fence, which includes the 3.053-acre remedial boundary, the support zone, and the buffer zone between the proposed fence and the north and eastern sides of the Site. A buffer zone on the southern side of the Site contains a proposed Remedial Contractor equipment laydown area. Site conditions are shown on Contract Drawing C-1 and the Support Zone Plan is described on Contract Drawing C-3.

Directly west of the Site is an active commercial waste handling and recycling facility operated by the Boone County Resource Recovery Systems, Inc. (BCRRS). Access to the Site will be from State Route 421 and will be within a property easement shared with BCRRS.

Directly east of the Site across an unnamed ditch is the inactive Northside Sanitary Landfill (NSL) landfill. This facility is also a Superfund Site and is presently undergoing remedial design activities. The south end of the Site is approximately 500 feet from an existing residence and is approximately 400 feet from Finley Creek, the main surface water drainage in the site area.

Residential properties are also located to the north and west, within 1/2 mile of the facilities. A small residential community, Northfield, is located north of the Site on State Route 421. Approximately 50 residences are located within 1 mile of the Site.

The Site is in an area that is gently sloping, predominantly to the east towards the unnamed ditch. The unnamed ditch runs north to south along the eastern edge of the Site and drains the Site either directly or from tributary ditches on the north and south ends of the Site. The unnamed ditch flows south from the Site to Finley Creek.



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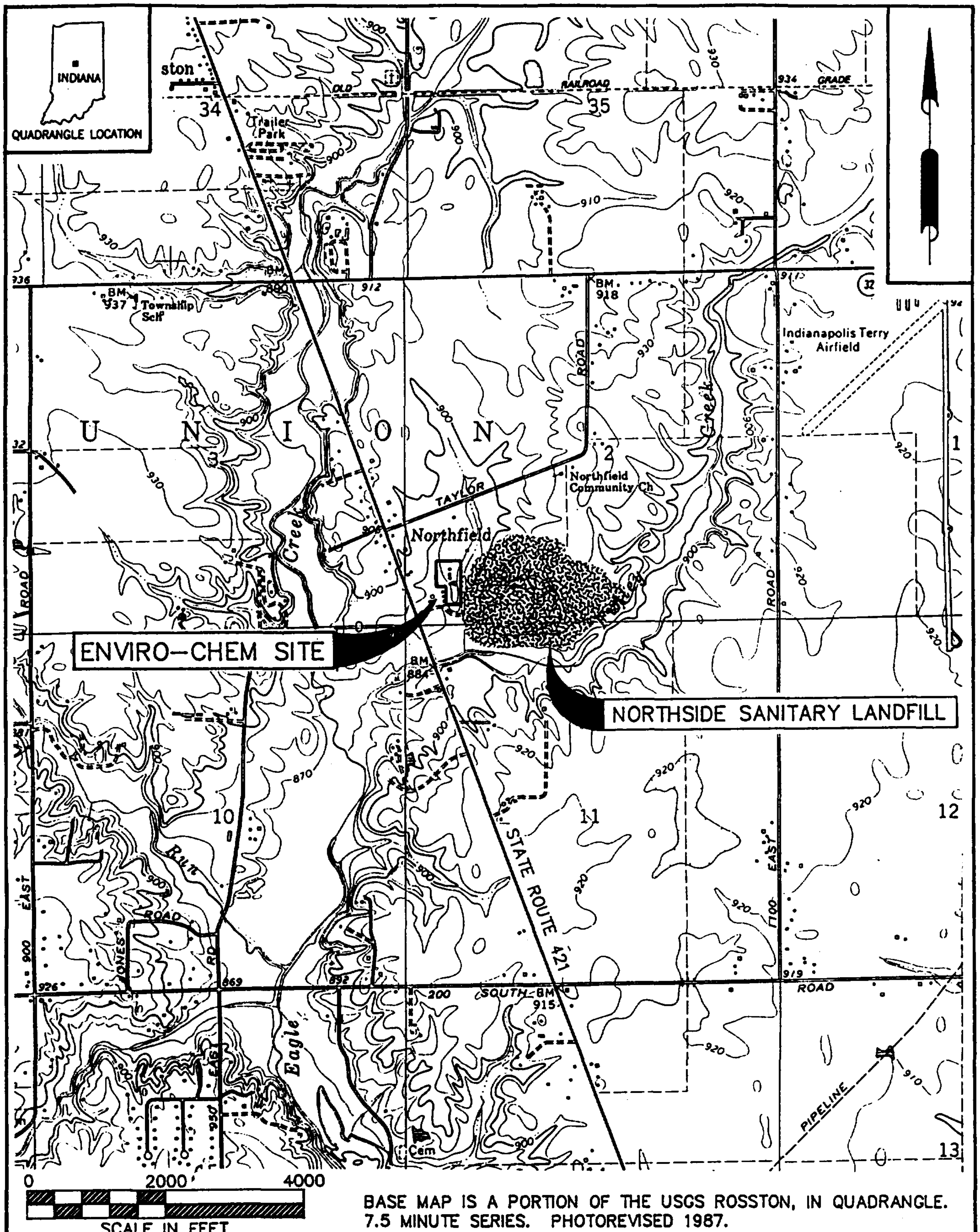
SITE LOCATION MAP

ENVIRO-CHEM SUPERFUND SITE — ZIONSVILLE, IN

CLIENT: ENVIRONMENTAL CONSERVATION & CHEMICAL CORP. TRUST		JOB NUMBER: 2259-552	
SCALE: AS SHOWN	FIGURE NUMBER 1-1		REV 0



BASE MAP IS A PORTION OF THE USGS ROSSTON, IN QUADRANGLE. 7.5 MINUTE SERIES. PHOTOREVISED 1987.

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SITE MAP

ENVIRO-CHEM SUPERFUND SITE — ZIONSVILLE, IN

CLIENT: ENVIRONMENTAL CONSERVATION & CHEMICAL CORP. TRUST		JOB NUMBER: 2259-552	
SCALE: AS SHOWN	FIGURE NUMBER 1-2		REV 0

Various solid waste materials are present at the Site both within the remedial boundary and within the support zone. Emergency actions undertaken prior to 1990 have resulted in the removal of the major sources of contamination. The structures remaining at the Site include cleaned tanks, the process building, the A-frame structure, the concrete pad with approximately 250 drums, and miscellaneous debris.

1.2 Site History

1.2.1 General

ECC was engaged in the recovery, reclamation, and brokering of primary solvents, oils, and other wastes. Waste products were received in drums and bulk tankers and then prepared for subsequent reclamation or disposal.

ECC was placed into receivership in July 1981. Drum shipments to the Site were halted in February 1982. Surface cleanup activities conducted by U.S. EPA and PRP contractors during 1983 and 1984 included the removal of cooling pond waters, waste drums, tank waste, contaminated soil, and cooling pond sludge.

A Remedial Investigation/Feasibility Study (RI/FS) was conducted by CH2M Hill for the U.S. EPA from 1983 through 1986. The Record of Decision (ROD) for the Site was published on September 25, 1987. The ROD was amended on June 7, 1991 and the Consent Decree for the remediation of the Site was entered on September 10, 1991.

1.2.2 Previously Collected Data

Past chemical contaminant data collection activities relevant to the Site Preparation and Material Removal phase are summarized in Table 1-1. The constituents listed and corresponding concentration ranges (minimum/maximum) could potentially be present in drummed materials still onsite, and may remain as residues on or in certain inventoried items listed in Appendix A of the Site Preparation and Material Removal Technical Specifications.

TABLE 1-1

SUMMARY OF REMEDIAL INVESTIGATION DATA[1]
ECC SITE
PAGE 1 OF 6

Parameter	Soil[2] Minimum[3]	Soil[2] Maximum[3]	Sediments Minimum[3]	Sediments Maximum[3]	Subsurface Water Minimum (μg/L)	Subsurface Water Maximum (μg/L)	Offsite Surface Water Minimum (μg/L)	Offsite Surface Water Maximum (μg/L)
Volatile								
Benzene					ND/4 J	9 K		
Chlorobenzene	ND/360	360						
1,1,1-Trichloroethane	ND/3 J	1,100,000			ND/5 K	7	ND/6	120
1,1-Dichloroethane	ND/380 J	380 J			ND/51.2	96	ND/45	45
1,1,2-Trichloroethane	ND/14	550						
Chloroethane					ND/29	120	ND/12	12
Chloroform	ND/5 J	2,900			ND/3 JB	9 K		
1,1-Dichloroethene	ND/47	35,000 B			ND/6	10		
Trans-1,2-Dichloroethene	ND/9	120,000 B			ND/3 J	4,000	ND/6 d	330
Trans-1,3-Dichloropropene					ND/77.5	77.5		
Ethyl Benzene	ND/14	1,500,000			ND/3 J	9 K	ND/2 d	13 d
Methylene Chloride	ND/8	310,000	ND/6.1	9.1	ND/2 J	64	ND/3 d	86
Trichlorofluoromethane			ND	ND	ND	ND		
Tetrachloroethene	ND/5 J	650,000			ND/9 K	9 K	ND/5 d	29
Toluene	ND/6	2,000,000			ND/9 K	9 K	ND/6	82

TABLE 1-1

SUMMARY OF REMEDIAL INVESTIGATION DATA[1]
ECC SITE
PAGE 2 OF 6

Parameter	Soil[2]		Sediments		Subsurface Water		Offsite Surface Water	
	Minimum[3]	Maximum[3]	Minimum[3]	Maximum[3]	Minimum (μg/L)	Maximum (μg/L)	Minimum (μg/L)	Maximum (μg/L)
Trichloroethene	ND/3 J	4,800,000 B			ND/3 J	28,000	ND/13	240
Vinyl Chloride	ND/7	7			ND/6	85.8	ND/10	11
Acetone	ND/16	650,000			ND/9 KB	15,030 B	ND/30	1,100
2-Butanone	ND/6 J	2,800,000			ND/9 K	26 B	ND/16	560
4-Methyl-2-Pentanone	ND/35 J	190,000						
Styrene					ND/5 K	5 K		
o-Xylene							ND	ND
Total Xylenes	ND/11	6,800,000			ND/9	12	ND/11	47
Acid Extractables								
p-Chloro-m-Cresol							ND/30 d,e	30 d,e
Phenol	ND/610	570,000					ND/92 e	92 e
2-Methylphenol	ND/340	340					ND/27 e	27 e
4-Methylphenol	ND/53,000	53,000					ND/89 e	120 e

TABLE 1-1

SUMMARY OF REMEDIAL INVESTIGATION DATA[1]
ECC SITE
PAGE 3 OF 6

Parameter	Soil[2] Minimum[3]	Soil[2] Maximum[3]	Sediments Minimum[3]	Sediments Maximum[3]	Subsurface Water Minimum (µg/L)	Subsurface Water Maximum (µg/L)	Offsite Surface Water Minimum (µg/L)	Offsite Surface Water Maximum (µg/L)
Base/Neutrals								
1,2-Dichlorobenzene	ND/240	900,000						
Fluoranthene					ND/20 K	20 K		
Isophorone	ND/270	440,000			ND/20 K	20 K	ND/86 e	ND/240 e
Naphthalene	ND/640	180,000						
bis(2-Ethylhexyl)phthalate	ND/230	370,000	ND/912	912	ND/23 K	23 K	ND	ND
Butyl Benzyl Phthalate	ND/400 J	47,000						
Di-n-Butyl Phthalate	ND/53	8,200						
Di-n-Octyl Phthalate	ND/310	2,100					ND/17 d,e	17 d,e
Diethyl Phthalate	ND/1,200	9,000			ND/20 K	20 K		
Dimethyl Phthalate	ND/360 J	1,300						
Crysene					ND/20 K	20 K		
Fluorene	ND/260	260						
Phenanthrene	ND/350	8,100						
Pyrene					ND/30	30		
2-Methylnaphthalene	ND/1,900	2,100						

TABLE 1-1

SUMMARY OF REMEDIAL INVESTIGATION DATA(1)
ECC SITE

Parameter	Soil(2)		Sediments		Subsurface Water		Offsite Surface Water	
	Minimum(3)	Maximum(3)	Minimum(3)	Maximum(3)	Minimum (μg/L)	Maximum (μg/L)	Minimum (μg/L)	Maximum (μg/L)
PCB-1232	ND/340 C	540 C						
PCB-1260	ND/750	39,000						
Inorganics								
Aluminum	1,920	44,800	2,172	9,744	ND/[65]	61,500	ND/[69]a	3,050 a
Antimony	ND/42	42	ND	ND	ND/4	4	ND	ND
Arsenic	ND/[4.5]	20	ND	ND	ND/15	15	ND	ND
Barium	[27]	1,730	27	102	150	1,070	ND/[92]	180
Beryllium	ND/[.36]	[3.9]	ND/0.6	0.6	ND	ND	ND	ND
Cadmium	ND/2.9	27	1.3 c	2.3	ND	ND	ND	ND
Calcium	[2,500]*	1,260,000	N/A	N/A	70,240 E	161,100 E	N/A	N/A
Chromium	9.6	145*	4	13	ND/11	144	ND/15	15
Cobalt	[3.4]	[51]	ND/5.3	5.3	ND/80	80	ND	ND
Copper	[13]	167	7	23	ND/[16]	106	ND/[18]	[18]
Iron	11,900	147,000	8,598	18,696	[51]	105,000	[77]	4,460
Lead	4.5	432*	6.8	31.3	ND/6.5	102	ND	ND
Magnesium	[2,060]*	292,000	N/A	N/A	29,780 E	131,800 E	N/A	N/A

TABLE 1-1

SUMMARY OF REMEDIAL INVESTIGATION DATA[1]
ECC SITE
PAGE 5 OF 6

Parameter	Soil[2]		Sediments		Subsurface Water		Offsite Surface Water	
	Minimum[3]	Maximum[3]	Minimum[3]	Maximum[3]	Minimum (μg/L)	Maximum (μg/L)	Minimum (μg/L)	Maximum (μg/L)
Manganese	158	6,870	161	499	ND/17	1,930	76	1,708
Mercury	ND	ND	ND/0.05	2.25	ND/0.2	0.4	ND/0.2 b	0.4 b
Nickel	[5.8]	37	ND/13	23	ND/[32]	176	ND/[21]	47
Potassium	ND/[905]	[10,500]	N/A	N/A	ND/[1195]	105,940	N/A	N/A
Selenium	ND	ND	ND	ND	ND/3	4	ND/6	6
Silver	ND/[3.3]	[3.8]	ND	ND	ND/14	33	ND/[9.2]	9.2
Sodium	ND/[480]	[15,600]	N/A	N/A	10,060	380,700	N/A	N/A
Thallium	ND	ND	ND	ND	ND/0.4	0.4	ND	ND
Tin	ND/17	30	ND	ND	ND	ND	ND	ND
Vanadium	[15]	37	ND/23	23	ND	ND	ND	ND
Zinc	[38]	650*	ND/52	75	ND/11	276	ND/36 B	79 B
Cyanide	ND/0.8	4.4	ND/33	73	ND	ND	ND/0.005	0.013

Notes

(1) These data were obtained from the tables of analytical results presented in Section 4.0 of the RI Report by CH2M Hill, dated March 14, 1986.

(2) The ranges given for soil are taken from the Phase II data only, since some soil was removed from the site after the Phase I analyses.

(3) The units for the soil and sediment analyses are: μg/kg for volatiles, acid extractables, base neutrals, and PCBs/pesticides results; and mg/kg for the inorganics results.

Key

*	The duplicate analysis was not within control limits.
[]	The value was less than the Contract Required Detection Limit.
B	The analyte was found in the laboratory blank and in the sample, which indicates probable contamination.
C	The identification of this polychlorinated biphenyl (PCB)/pesticide parameter has not been confirmed by gas chromatography/mass spectrometry (GC/MS).
J	The value is estimated and occurs when the mass spectra data indicate the presence of a compound that meets the identification criteria and the result is less than the specified detection limit but greater than zero.
E	The value is estimated or not reported because of the presence of interferences.
K	The actual value, within the limits of the method, is less than the value given.
a	There was a poor or marginal recovery of this spiked metal.
b	This metal was also detected in the analysis of the field blank.
c	This value should be regarded as a qualitative indication of the presence of these metals because the concentration is below the lowest quantitative standard.
d	An estimated value.
e	The Quality Assurance (QA) review identified the results as semiquantitative because the average surrogate recovery was < 40 percent.
ND	The compound was not detected. A number after ND in the "Minimum" column is the lowest detected concentration of the compound. For example, "ND/6" means that the compound was not detected in some samples and that the lowest detected concentration was 6.
N/A	The compound was not analyzed for.
	A blank space in the table indicates that no analytical results were given in the Remedial Investigation Report for that compound in that matrix. The compound was either not analyzed for or not detected.

1.3 Site Preparation and Material Removal Objectives

The objectives of the Site Preparation and Material Removal activities at the ECC Site are to:

- Prepare the site support zone facilities for implementation of material removal activities (see C-3 "Support Zone Plan" of the Contract Drawings).

- Remove all above ground materials within the Site area, including tanks, structures, and miscellaneous debris, and decontaminate and stage these materials for transport offsite.

- Transport all removal materials offsite to suitable disposal or recycling facilities.

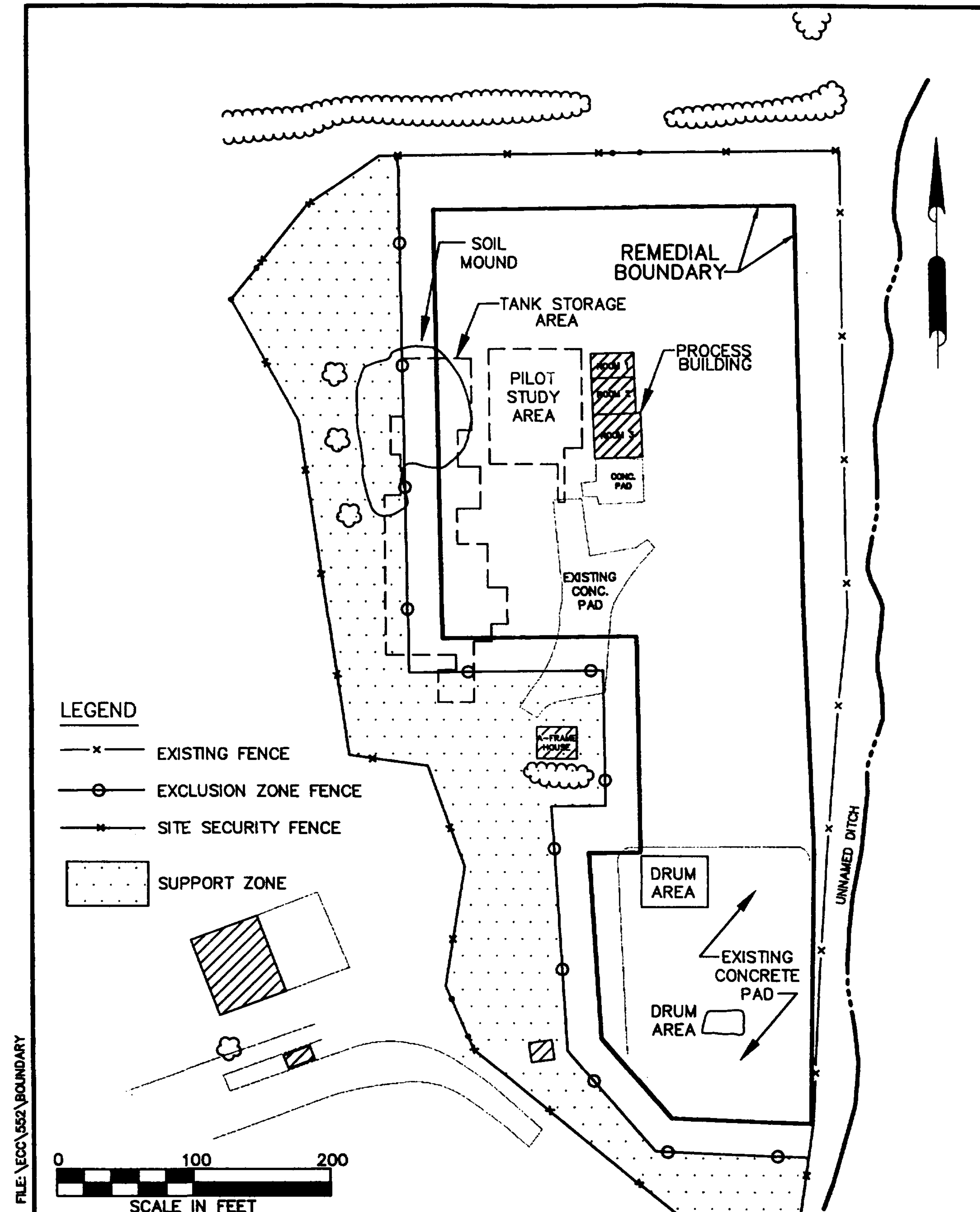
Figure 1-3 presents the site boundary locations which will exist during the remedial action phases.

1.4 Material Handling and Sampling Approach

1.4.1 Tanks

Presently, 53 used process tanks are staged on the west side of the ECC property. These tanks originated from the solvent recovery operations during the late 1970s to early 1980s. Additionally, there are a few smaller volume fuel tanks which are among the building and outside debris. These tanks will be handled according to Section 02081 and Figure 1 in Appendix C of the Technical Specifications. No sampling is proposed for the old process tanks.

Sampling of the old process tanks for subsequent analytical testing is not proposed since the tanks were found to be empty, except for possibly a small volume of residual rinse or rain water, during a field inventory reconnaissance (November 13 and 14, 1992). The tanks are also reported to have been cleaned during past removal actions. During the Site Preparation and Material Removal Phase, the tanks will be high pressure spray washed (interior and exterior)



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SITE BOUNDARIES

ENVIRO-CHEM SUPERFUND SITE ZIONSVILLE, IN

CLIENT: ENVIRONMENTAL CONSERVATION & CHEMICAL CORP. TRUST	JOB NO. 2259-552
SCALE: AS SHOWN	FIGURE NUMBER 1-3	REV 0

and surveyed with an organic vapor meter (OVM) for clearance and removal from the site contamination reduction zone (decontamination pad) and transfer to the scrap staging area.

1.4.2 Miscellaneous Drums

Approximately 270 drums are also at the site which originated from past investigations and the remedial activities of previous and present contractors (i.e., drilling operations, pilot and field studies, etc.). An inventory of the number of drums and their location was taken during the November, 1992 AWD field reconnaissance. Certain drums not presently located on the southern concrete pad and in areas to be demolished and/or constructed will have to be moved to the southern concrete pad where most of the onsite drums are presently staged. Many drums are in poor condition and several are bulging. All drums which must be handled will be surveyed for organic vapors and visually inspected prior to handling for health and safety purposes and possible special handling requirements.

1.4.2.1 Drum Integrity Evaluation

Prior to handling any drum, a visual inspection and OVM scan will be performed on the drum exterior. OVM readings above background or drums which appear to be under pressure (bulging) shall immediately be brought to the attention of the Site Safety Officer (SSO).

Because of the possibility of encountering a drum in a shock-sensitive state, any bulging drums to be moved or sampled shall be remotely shaken. This will be performed by tying a rope around the drum and shaking it at a safe distance by an equipment operator (e.g., backhoe).

1.4.2.2 Drum Relocation

Following inspection of drums for shock sensitivity and integrity, drums which must be moved shall be relocated to the southern concrete pad. Overpacks which may be required for certain deteriorated and unable to be moved (DUM) drums, shall have all original identifiable drum markings recorded in field logbooks and transferred to the outside of the overpack drum.

1.4.3 Structures and Miscellaneous Materials and Debris

Tables 3 through 6 in Appendix A of the SPMR Technical Specifications show the materials and debris which exist inside the onsite buildings, in miscellaneous debris areas, and associated with past investigative activities. Most of the materials and debris are anticipated to be disposed of as solid nonhazardous waste, or salvaged and/or recycled.

The materials which make up the process building (i.e., block, aluminum siding, I-beams, roofing materials, wood, etc.) shall be handled according to the following procedure:

- Composite Sampling

  - Block, brick, concrete, wood, and miscellaneous materials associated with the process building shall be sampled by compositing similar materials and analyzing them for RCRA toxicity characteristics. Assuming that results prove those materials are non-hazardous the analytical results shall be submitted to the Indiana Department of Environmental Management (IDEM) Special Waste Section for one time disposal approval into a permitted sanitary (Subtitle D) landfill. Approval is contingent on submittal of application and review of the subject waste characterization. The sampling approach for these materials shall also be submitted to the IDEM Project Coordinator and the Special Waste Section for Review and Coordination with Hazardous Waste. "Grab" samples of representative specimens of the structural nonmetallic portions of the building shall be collected by drilling, chipping, or cutting these materials as necessary to obtain a suitable sample volume for preparation of the composite samples.

    Composite sampling of similar materials will be performed for assessment of offsite disposal sources.

- Process Building

  Gross contamination of the process building is not anticipated since the ECC Site Remedial Investigation Report (March 14, 1986) states that the building and equipment were cleaned under an earlier surface cleanup (November 9, 1983 entered Consent Decree).

  - All metallic structure materials which are feasibly separated, such as aluminum siding and support beams, shall be routed through decontamination and recycled. All materials unwanted by the salvage company shall be disposed of as non-hazardous waste.

The miscellaneous materials and debris shall be handled in the following manner:

- Certain items such as herbicides, pesticides, paints, etc. shall be placed in laboratory packs and placed on the southern concrete pad pending laboratory analysis for disposal. Pesticides and herbicides shall be disposed of in accordance with the requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

- Non-leaking fluorescent light ballasts shall be disposed of as general solid waste in groups of 25 or less at a time. Multiple shipments of 25 or fewer ballasts is acceptable to meet this requirement. If more than 25 ballasts are disposed of in one shipment, special waste approval must be obtained from IDEM.

- Any leaking PCB-containing ballasts must be disposed of in accordance with Toxic Substances Control Act (TSCA) regulations or 329 IAC 4.

- Fluorescent tubes must be handled as Resource Conservation and Recovery Act (RCRA) hazardous waste and disposed of accordingly.

- All other miscellaneous materials and waste shall be listed on IDEM's special waste application and submitted for review and anticipated approval for disposal into a nonhazardous waste landfill.

- The large boiler within room 1 of the process building shall be handled as hazardous waste and disposed of accordingly. Prior to removal of the boiler, the insulation materials and brick within the boiler shall be sampled and analyzed to confirm the absence of asbestos. "Grab" samples of the insulation materials and brick shall be collected by drilling, chipping, or cutting these materials as necessary to obtain a suitable sample volume for preparation of the composite samples

1.5 Target Parameters and Intended Usage

1.5.1 Field Parameters

All field testing shall be in the form of general surveys for organic vapors, and shall be used to provide health and safety data in relation to onsite labor, and to screen handled materials for organic contaminants. Organic vapor monitoring is covered in the HASP and is not discussed further in this QAPP.

1.5.2 Laboratory Parameters

Most laboratory parameters will be decided upon by the accepting waste disposal facility based on the information supplied by the Contractor through completion of waste profile sheets. Waste profile sheets are obtained from, and specific to each individual waste TSD facility. Information from Table 1-1 can be used to satisfy profiling of the liquid wastes which will be bulked in a liquid hazardous waste tanker.

IDEM's Office of Solid and Hazardous Waste Management has a "Special Waste Certification Application" which will be completed for the non-hazardous items referenced in Section 1.4.4.

Certain of these items will need to be analyzed under the Toxic Characteristics Leaching Procedure (TCLP) for leachable components. These items include the process building structural block between rooms and certain items which will require the judgement and coordination of the Contractor and IDEM. Analytical results on materials shown to be non-hazardous through TCLP testing will be attached to the Special Waste Certification Application for IDEM's review.

1.5.3 Data Quality Objectives (DQOs)

DQOs are qualitative and quantitative statements defined by U.S. EPA that specify the quality of the data required to support decisions made during site remediation activities and are based on the end uses of the data to be collected. As such, different data uses may require different levels of data quality.

These levels are distinguished by the types of technology and documentation used, and their degree of sophistication as follows:

- Level V - Nonstandard methods. Analyses which may require method modification and/or development.

- Level IV - CLP Routine Analytical Services (RAS). This level is characterized by rigorous QA/QC protocols and documentation and provides qualitative and quantitative analytical data. Some regions have obtained similar support via their own regional laboratories, university laboratories, or other commercial laboratories.

- Level III - Laboratory analysis using methods other than the CLP RAS. This level is used primarily in support of engineering studies using standard U.S. EPA approved procedures.

- Level II - Field analysis. This level is characterized by the use of portable analytical instruments which can be used onsite, or in mobile laboratories stationed near a site (close-support laboratories). Depending upon the types of contaminants, sampling matrix, and personnel skills, qualitative and quantitative data can be obtained.

- Level I - Field Screening. This level is characterized by the use of portable instruments which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. Data can be generated regarding the presence or absence of certain contaminants (especially volatiles) at sampling locations. Essentially non-qualitative; quantitative only for total organics.

DQO Level 3 will be the highest level of control used for all analytical work required during the Site Preparation and Material Removal Phase. This provides an intermediate level of data quality and will be used for material screening and engineering decisions. Engineering analyses will include the analytical methods listed in Table 7-1 (e.g., laboratory data with quick turnaround used for screening but without full CLP QC documentation).

The primary data uses for the ECC Site Preparation and Material Removal Phase sampling are to assess certain bulked matrixes, items, and debris for adequate chemical characterization and disposal facility acceptance. Some of the data may be used to support health and safety decisions (i.e., to establish the level of protection needed for sampling activities at the Site).

2

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The various QA and management responsibilities of key project personnel associated with environmental sampling and analysis are defined in the following subsections. A project organization chart, which includes the lines of authority and interaction, is included as Figure 2-1.

2.1 ECC Trust's Engineer

The ECC Trust's Engineer (Engineer) will have the overall authority for the implementation of the SPMR activities at the ECC Site. The Engineer has the authority to commit the resources necessary to meet the project objectives and requirements.

The Engineer will: (1) provide the major point of contact with the U.S. EPA and IDEM for matters concerning the project; (2) ensure that the project activities meet the requirements of the Consent Decree; and (3) approve all external reports (deliverables) before their submission to the agencies.

2.2 Independent Construction Quality Assurance (CQA) Officer

The Independent CQA Officer and staff, if required, is responsible for implementation of the QAPP through selective evaluation of sampling performed and data acquired by the Remedial Contractor. The Independent CQA Officer will be responsible for development of a QA Management Plan. The QA Management Plan will detail the Independent CQA Officer's procedures for evaluation of the Remedial Contractor's efforts as related to sampling and analyses, and provide the means for assurance of acceptable quality in regard to analytical procedures and reporting. The Independent CQA Officer will coordinate with the Remedial Contractor CQC Manager, IDEM, and the U.S. EPA Region V Quality Assurance Officer concerning all analytical reporting and decisions on waste characterizations and disposal.

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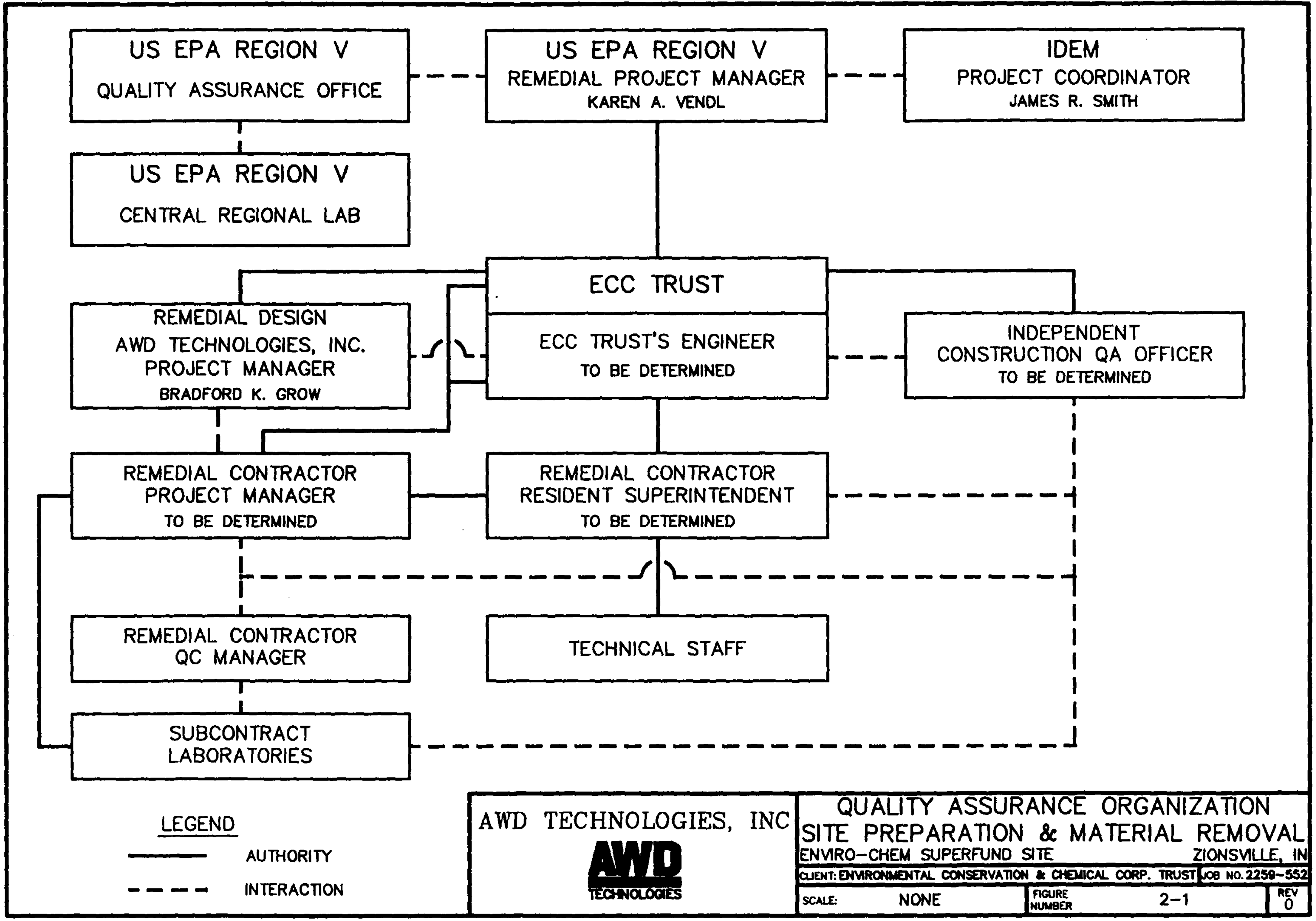

0052693RTH
0051193RTH

2.3 U.S. EPA Remedial Project Manager

The U.S. EPA Remedial Project Manager (RPM), will be responsible for overseeing the project and coordinating the U.S. EPA and IDEM's review and approval of the Remedial Design and major changes to the design.

2.4 IDEM Remedial Project Coordinator

The IDEM Remedial Project Coordinator will be responsible for overseeing the project and for conducting all IDEM reviews of the Remedial Design and major changes to the design.

2.5 Remedial Design Project Manager

The Remedial Design Project Manager is responsible for producing the Remedial Design for the SPMR, including the associated plans (i.e., the AMP, ECMP, SMP, QAPP, CQAP, and HASP), respectively.

2.6 Remedial Contractor Project Manager

The ECC Trust will select a Remedial Contractor to perform the SPMR activities. The Remedial Contractor Project Manager will have the overall responsibility for ensuring that the project meets the U.S. EPA objectives and the quality standards specified in this QAPP and the CQAP.

The Remedial Contractor Project Manager will: (1) acquire and apply technical resources as needed to ensure performance within budget and schedule constraints; (2) direct and monitor the Resident Superintendent and support staff; (3) review the work performed on each task to ensure its quality, responsiveness, and timeliness; and (4) be responsible for the preparation and quality of the reports submitted to the agencies.

2.7 Remedial Contractor Resident Superintendent

The Remedial Contractor Resident Superintendent will be responsible for leading and coordinating the day-to-day activities of the various workers and subcontractors under their supervision. The Remedial Contractor Resident Superintendent will be a highly experienced environmental professional and will report directly to the Remedial Contractor Project Manager. Specific responsibilities will include: (1) implementation of field-related work plans; (2) assurance of schedule compliance; (3) coordination and management of field staff; (4) compliance with QA/QC requirements described in this QAPP; (5) compliance with the corrective action procedures described in this QAPP; and (6) participation in the preparation of the final report.

2.8 Remedial Contractor Technical Staff

The technical staff for this project will be drawn from the Remedial Contractor's pool of resources. The technical staff team will perform field tasks, analyze the data, and prepare the reports.

2.9 Remedial Contractor Quality Control (CQC) Manager

The CQC Manager will have the overall responsibility for the Remedial Contractor's compliance with the QAPP requirements. The CQC Manager will review and approve all reports and corrective actions related to the Site; perform audits of the field activities and records; confirm subcontracted laboratory QA compliance; provide QA technical assistance to the remedial and technical staff; and report on the adequacy, status, and effectiveness of the QA program on a regular basis to the Remedial Contractor Project Manager.

The CQC Manager will also be responsible for validation of data reports on all sampling conducted under this phase. A letter validation report will be developed which contains a discussion on the results of the QA samples collected in the field and the laboratories internal QA analyses. The report shall summarize the findings of the review and give an indication of the general quality of the data.

2.10 U.S. EPA Region V Quality Assurance Officer (QAO)

The U.S. EPA Region V QAO will have the responsibility of reviewing and approving the QAPP.

2.11 Subcontract Laboratories' Project Managers

The analyses to be performed by laboratory subcontractors are listed in Table 7-1. The laboratories will be selected by the Remedial Contractor from the U.S. EPA's pre-approved list and will be approved by the ECC Trust and U.S. EPA/IDEM. The laboratories' Project Managers will be responsible for coordinating and scheduling the laboratory analyses; supervising the in-house chain of custody; accepting requirements outlined within this QAPP; and overseeing the data review and preparation of the analytical reports.

2.12 Subcontract Laboratories' Quality Assurance Officers (QAOs)

The laboratories' QAOs will be responsible for overseeing the laboratory QA and the analytical results QA/QC documentation, conducting the data review, selecting any necessary laboratory corrective actions, adherence to applicable in-house Standard Operating Procedures (SOPs), adherence to the QAPP, and approving the final analytical reports. Each laboratory may have more than one QAO if, for example, any of these various activities take place in different departments within the laboratory.

2.13 U.S. EPA Region V Central Regional Laboratory

The Laboratory Scientific Support Section of the Central Regional Laboratory (CRL) of U.S. EPA Region V will be responsible for external performance and system audits of the analytical laboratories.

2.14 Quality Assurance Submittals

A listing of Quality Assurance submittals and the personnel or organization responsible for preparation of the submittal, the recipient of the submittal, and the schedule for submissions is contained in Table 2-1.

TABLE 2-1

QA SUBMITTALS

Submittal	Preparer of Submittal	Recipient of Submittal	Schedule of Submissions
Laboratory Data (Raw)	Analytical laboratory	Remedial Contractor Quality Control Manager	28 days from receipt of samples
Validated Data and Validation Report	Remedial Contractor Quality Control Manager	Remedial Contractor Project Manager Quality Assurance Officer of U.S. EPA Region V IDEM (Special Waste Section)	14 days from receipt of data packages
Field Measurements Logbook	Field Personnel	Remedial Contractor Project Manager	Upon completion of specified project phase
Sample Collection Data Logbook	Sampling Personnel	Remedial Contractor Project Manager	Upon completion of specified project phase
Chain of Custodies	Sampling Personnel	Analytical Laboratory	Upon receipt of samples
QA Nonconformances - Field	Field Personnel	Appropriate Field Leader	Upon occurrence of nonconformance
QA Nonconformances - Laboratory	Laboratory Personnel	Analytical Laboratory's Quality Assurance Officer	Upon occurrence of nonconformance
Corrective Action Request (CAR)	Resident Superintendent	ECC Trust's Engineer U.S. EPA Project Manager IDEM Project Coordinator	As necessary
Quality Assurance Report	Remedial Contractor Quality Control Manager	ECC Trust's Engineer U.S. EPA Project Manager IDEM Project Coordinator	28 days after project completion

3.0 QUALITY ASSURANCE OBJECTIVES

The overall QA objective is to develop and implement procedures for sampling, chain-of-custody, laboratory analyses, field measurements, and reporting that will provide data of a quality consistent with its intended use. Specific procedures for sampling, chain-of-custody, laboratory and field instrument calibrations, laboratory analysis, reporting of data, internal quality control, audits, preventative maintenance of equipment, and corrective action are described in other sections of this QAPP.

3.1 Level of QC Effort

Rinsate and trip blank, field duplicate, and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling program. Rinsate blanks consisting of distilled water, used during field decontamination procedures on sampling equipment, will be submitted to the analytical laboratories to provide the means of assessing the quality of the data in respect to the field sampling program. Rinsate blank samples are analyzed to check for procedural contamination at the Site that may cause sample contamination while trip blanks are analyzed to check possible volatile organic compound cross contamination between samples during shipment and handling. Field duplicate samples are analyzed to check for sampling reproducibility. Matrix spikes (MS) provide information about the effect of the sample matrix on the digestion and measurement methodology.

The general level of the QC effort will be one field duplicate and one rinsate blank for every 10 or fewer samples. One extra volume of solid matrices needs to be collected for the MS analysis for TCLP parameters to be submitted for IDEM special waste certification.

3.2 Accuracy, Precision, and Sensitivity of Analyses

The QA objectives of laboratory analyses with respect to accuracy, precision, and sensitivity are to achieve the QC acceptance criteria of the analytical protocols. Accuracy and precision requirements for compatibility testing, TCLP, and PCB analyses which will be performed on certain site related solid waste are provided within the quality control sections of appropriate U.S. EPA's methods such as those outlined in Test Methods for Evaluating Solid Waste (SW-846).

The QA objectives for field surveys conducted using real-time measuring instruments are to obtain reliable results of potential volatile organic vapors and potential explosive/O_2 deficient atmospheres in order to make health and safety decisions only. These protocols are contained in the Health and Safety Plan developed for this project.

3.3 Completeness, Representativeness, and Comparability

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is expected that the laboratories will provide data which will supply the Contractor sufficient information to gain acceptance of waste materials into an approved waste disposal facility.

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that is dependent upon the proper design of the sampling program and proper selection of laboratory protocols. This sampling and analysis program is designed to provide data representative of the unwanted materials which are to be removed from the Site. The sampling procedures which are specified in the FSP were developed giving special consideration to existing analytical results from previous site investigations, the physical characteristics of the materials and debris, and the anticipated end disposal. Representativeness will be achieved using proper sampling and handling techniques (specified in the FSP), by properly preserving the samples, extracting and analyzing the samples within the required holding times, and using clean and appropriate sample containers. The adequacy of the sampling procedures will be assessed by analyzing field duplicates.

Comparability expresses the confidence with which one data set can be compared with another. The extent to which existing and planned analytical data will be comparable depends on the similarity of sampling and analytical methods. The procedures used to obtain the planned analytical data, as described in the QAPP, are expected to provide comparable data. These new analytical data, however, may not be directly comparable to existing data because of differences in procedures, QA objectives, and media being tested.

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4.0 FIELD SAMPLING PLAN (FSP)

The FSP for Site Preparation and Material Removal contains all information pertinent to the field sampling equipment and procedures, and is provided as Appendix A to this document.

5

5.0 SAMPLE CUSTODY PROCEDURES

This QAPP presents the sample custody protocols described in "NEIDC Policies and Procedures" (EPA-330/9-78-DDI-R, revised June 1985). Sample custody consists of three parts: sample collection, laboratory analysis, and final evidence files. A sample or evidence file will be considered under a person's custody if it: (1) is in a person's physical possession, (2) is in view of the person after he/she has taken possession, (3) has been secured by that person so that no one can tamper with the sample, or (4) has been secured by that person in an area that is restricted to authorized personnel. Final evidence files, including all originals of laboratory reports and field files, will be maintained in a secure area.

5.1 Field Chain-of-Custody Procedures

The field sampling and shipment procedures summarized below will ensure that the samples will arrive at the laboratory with the chain-of-custody intact. The protocols for specific sample numbering are included in the FSP.

5.1.1 Field Procedure

The field custody procedures to be followed by all sampling personnel include:

- The field sampler will be personally responsible for the care and custody of the samples until they are transferred or properly dispatched. As few people as possible will handle the samples.
- All samples will be tagged with sample numbers and locations.
- Sample tags will be completed for each sample using waterproof ink.

5.1.2 Field Logbooks/Documentation

Field logbooks will provide the means of documenting the activities performed at the Site. As such, entries will be in as much detail as possible so that persons going to the Site could reconstruct a particular situation without relying on memory.

Field logbooks will be bound, field survey books or notebooks. Logbooks will be assigned to field personnel, but will be stored in the document control center when not in use. Each logbook will be identified by a project-specific number.

The title page of each logbook will contain the following information:

- Person to whom the logbook is assigned
- Logbook number
- Project name
- Project start date
- Project end date

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, names of all sampling team members present, level of personal protection being used, and the signature of the person making the entry will be entered. The names of visitors to the Site, as well as the purpose of their visit will also be recorded in the field logbook.

All measurements will be recorded and all of the collected samples will be described in the field logbook. All entries will be made in ink, and no erasures will be permitted. If an incorrect entry is made, the information will be crossed out with a single strike out. Whenever a sample is collected or a measurement is taken, a detailed description of the location, which includes compass and distance measurements, shall be recorded. The numbers of the photographs taken of the location, if any, will also be noted. All equipment used to take measurements will be identified, along with the date of calibration, if applicable.

Samples will be collected following the sampling procedures specified in the FSP. The equipment used to collect samples will be noted, along with the time of sampling, sample description, and volume and number of containers. Sample identification numbers will be assigned prior to sample collection. Field QA/QC samples, which receive entirely separate sample identification numbers, will be noted under the sample description.

5.1.3 Transfer-of-Custody and Shipment Procedures

The transfer-of-custody and shipment procedures will be as follows:

- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a permanent laboratory, or to/from a secure storage area.

- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory or waste disposal facility for analysis, and/or acceptance approval, with a separate signed custody record enclosed in each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. Custody seals will be attached to the front right and back left of the cooler and will be covered with clear plastic tape. The cooler will be strapped shut with strapping tape in at least two locations.

5.2 Final Evidence Files Custody Procedures

The Remedial Contractor will maintain the Site Preparation and Material Removal evidence files. The evidence files will include all relevant records, correspondence, reports, logs, field logbooks, laboratory sample preparation and analysis forms, data packages, pictures, subcontractor reports, chain-of-custody records, and data review reports. The evidence files will be under the custody of the Remedial Contractor Project Manager in a locked, secure area.

5.3 Laboratory Chain of Custody Procedures

The chain-of-custody procedures for the laboratories will be included in the laboratories' quality assurance plan to be submitted after selection from the U.S. EPA's pre-approved list and will be included as an appendix to the QAPP at that time.

6

6.0 CALIBRATION PROCEDURES AND FREQUENCY

This section describes the procedures for maintaining the accuracy of all the instruments and measuring equipment that are used for conducting field tests and laboratory analyses. These instruments and equipment should be calibrated prior to each use or on a scheduled, periodic basis.

6.1 Field Instruments/Equipment

Instruments and equipment used to gather, generate, or measure chemical parameters of interest will be calibrated with sufficient frequency and in such a manner to ensure that accuracy and reproducibility of results are consistent with the manufacturer's specifications.

Equipment to be used during the field sampling will be examined to certify that it is in operating condition. This includes checking the manufacturer's operating manual and the instructions for each instrument to ensure that all maintenance requirements are being observed. Field notes from previous sampling trips will be reviewed so that any prior equipment problems are not overlooked, and all necessary repairs to equipment have been carried out.

Calibration of field instruments will be performed at the intervals specified by the manufacturer or more frequently as conditions dictate. Field instruments will include an Organic Vapor Meter (OVM), and an explosimeter (LEL)/O_2 meter.

6.2 Laboratory Equipment

Calibration of laboratory equipment will be based on approved, written procedures. Records of calibration, repairs, or replacement will be filed and maintained by the designated laboratory personnel performing QC activities. These records will be filed at the location where the work is performed and will be subject to QA audit. For all instruments, the laboratory will maintain a repair staff with in-house spare parts or will maintain service contracts with vendors.

For the analyses conducted for the SPMR phase, the calibration procedures and frequencies specified in the applicable laboratory SOWs will be followed exactly. All laboratories chosen to perform work under this phase of the remedial action should have in place in-house operating programs detailing the method, materials, and schedules to be used in the routine inspection, auditing, cleaning, maintenance, testing, calibration, and/or standardization of equipment. Corrective action to be taken in the event of failure or malfunction of equipment shall be specified. The procedures must designate the person responsible for the performance of each operation. Written records must be maintained for all inspections, auditing, maintenance, testing, calibrating, and/or standardizing operations.

7.0 ANALYTICAL PROCEDURES

7.1 Laboratory Analysis

Tables 7-1 and 7-2 provides a list of the parameters to be tested for and analytical methods to be followed by the chosen laboratories for each anticipated waste.

TABLE 7-1

SUMMARY OF FIELD SAMPLING AND ANALYSIS

Waste Media	Phase	No. of Samples	Sampling Device	Sample Container	Sample Preservation	Holding Time	Analysis	Method Reference	Data Quality Obj.
Process Building Materials and Other Debris Intended for Special Waste Certification through IDEM	Solid	Unknown[2]	Hammer and Chisel/Masonry Saw (Process Building Masonry)	(2) 32 oz. wide mouth glass jars	None required	None required	RCRA TCLP (see Table 7-2)	Per 40 CFR 261	3
Fluorescent Light Ballasts	Liquid	1	Open End Sampler	1 liter amber glass jar	Ice to 4°C	7 days extract 40 days analyze	PCBs[3]	U.S. EPA Method 608	3
Bulked Liquid Waste/ Tanker	Liquid	1/Tanker	Stainless steel Bailer/ Open End Sampler	See Note [1]	See Note [1]	See Note [1]	TSD Profile	See Note [1]	2

Notes

(1) TSD profile analyses to be performed by waste receiver (treatment or disposal) as a confirmation of previous waste characterization. Sample containers and preservation requirements will be identified after TSD analyses requirements are determined.

(2) There will be a minimum of one composite sample from each masonry block wall from each of the separate rooms within the old process building.

(3) Detection limits for PCBs will be provided by laboratory selected from the U.S. EPA's pre-approved list.

TABLE 7-2

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) ANALYTICAL METHODS FOR PROCESS BUILDING MATERIALS AND OTHER DEBRIS INTENDED FOR SPECIAL WASTE CHARACTERIZATION THROUGH IDEM

Compounds	Analytical Methods	Method Detection Limit (mg/L)	TCLP Regulatory Levels (mg/L)*
Volatile Organics			
Acetone	CLP SOW OLM01.0	0.01	
Chlorobenzene	CLP SOW OLM01.0	0.01	100.0
Chloroform	CLP SOW OLM01.0	0.01	6.0
1,1-Dichloroethane	CLP SOW OLM01.0	0.01	
1,1-Dichloroethene	CLP SOW OLM01.0	0.01	0.7
Ethylbenzene	CLP SOW OLM01.0	0.01	
Methylene Chloride	CLP SOW OLM01.0	0.01	8.6**
Methyl Ethyl Ketone	CLP SOW OLM01.0	0.01	200.0
Methyl Isobutyl Ketone	CLP SOW OLM01.0	0.01	
Tetrachloroethene	CLP SOW OLM01.0	0.01	0.7
Toluene	CLP SOW OLM01.0	0.01	14.4*
1,1,1-Trichloroethane	CLP SOW OLM01.0	0.01	30.0**
1,1,2-Trichloroethane	CLP SOW OLM01.0	0.01	1.2**
Trichloroethene	CLP SOW OLM01.0	0.01	0.5
Total Xylenes	CLP SOW OLM01.0	0.01	
Semivolatile Organics			
Bis(2-ethylhexyl)phthalate	CLP SOW OLM01.0	0.01	
Di-n-butyl Phthalate	CLP SOW OLM01.0	0.01	
Diethyl Phthalate	CLP SOW OLM01.0	0.01	
Isophorone	CLP SOW OLM01.0	0.01	
Naphthalene	CLP SOW OLM01.0	0.01	
Phenol	CLP SOW OLM01.0	0.01	14.4**

TABLE 7-2

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) ANALYTICAL METHODS FOR PROCESS BUILDING MATERIALS AND OTHER DEBRIS INTENDED FOR SPECIAL WASTE CHARACTERIZATION THROUGH IDEM

Compounds	Analytical Methods	Method Detection Limit (mg/L)	TCLP Regulatory Levels (mg/L)*
Inorganics			
Antimony	CLP SOW OLM01.0	0.06	
Arsenic	CLP SOW OLM01.0	0.01	5.0
Barium	CLP SOW OLM01.0	0.2	100.0
Beryllium	CLP SOW OLM01.0	0.005	
Cadmium	CLP SOW OLM01.0	0.005	1.0
Chromium VI	SW-846 Method 7195	0.005	5.0 (Total Cr)
Lead	CLP SOW OLM01.0	0.003	5.0
Manganese	CLP SOW OLM01.0	0.015	
Nickel	CLP SOW OLM01.0	0.04	
Silver	CLP SOW OLM01.0	0.01	5.0
Tin	SW-846 Method 6010	0.2	
Vanadium	CLP SOW OLM01.0	0.05	
Zinc	CLP SOW OLM01.0	0.02	
Cyanide	CLP SOW OLM01.0	0.01	

Notes

* U.S. EPA, 1990
** Proposed, U.S. EPA, June 13, 1986

Holding Times for TCLP Leachates

Volatiles - 7 days
Semivolatiles - 7 days to extraction, 40 days to analysis
Metals - 6 months
Cyanide - 14 days

See Appendix B of the FSP for a description of the TCLP extraction procedure

8.0 INTERNAL QUALITY CONTROL CHECKS

8.1 Field Sample Collection

All the field QC will be carried out in accordance with the procedures described in this QAPP. Field QC will include:

- Sample collection, including MS, field duplicates, and rinsate blanks as specified in Section 3.0 for use in the assessment of precision and accuracy, according to the sampling procedures established in the FSP.

- Proper decontamination of sampling equipment after each use, as described in the FSP.

- Proper calibration of the field instruments, as established in Section 6.1 of this QAPP.

8.2 Field Measurements

QA for field measurements will consist of review of OVM calibration and replication of measurements to ensure reproducibility.

8.3 Laboratory Analyses

The laboratories will implement a QA program and QC checks to ensure the generation of analytical data of known and documented usable quality. The Contractor shall obtain each subcontracted laboratory's QA/QC written program relating to the analysis which the laboratory is contracted to perform. This program shall be placed as an addendum to this QAPP.

8.3.1 Quality Assurance Program

Commercial laboratories should have written QA/QC programs that provide rules and guidelines to ensure the reliability and validity of work performed. Compliance with the QA/QC program is coordinated and monitored by a QAO at each laboratory, who is independent of the operating departments. Internal QC procedures for analytical services will be conducted by the laboratories in accordance with their own in-house QA/QC program, which should include written documentation as described in Section 6.2 of this QAPP.

9.0 DATA REDUCTION, VALIDATION, AND REPORTING

Procedures for documenting sample collection and custody, validating analytical data, and reporting the results of the material removal activities are covered in this section.

9.1 Data Reduction

9.1.1 Field Measurements and Sample Collection

Field measurements and sample collection data will be recorded in the field logbook. If these data are to be used in the project reports, they will be reduced and summarized, and the method of reduction will be documented in the specific report. Sample custody and analysis requests will be documented on chain-of-custody records and sample analysis request forms.

9.1.2 Laboratory Services

Analytical data reduction will be carried out by each laboratory performing analysis on waste material. The data reduction will be reviewed and checked as part of the data evaluation and decision making process for disposal options. Compounds detected in blanks will not be subtracted from analytical results of waste samples and will be reported separately.

Results obtained through the testing of wastes for TCLP parameters will not be corrected for analytical bias (spike recovery correction) as amended by U.S. EPA (November 24, 1992).

9.2 Data Validation

Data validation will consist of review and evaluation of field and/or laboratory QA/QC sample data by the analytical laboratories' QAO and the Remedial Contractor Quality Control Manager.

Selected analytical laboratories will perform in-house analytical data validation under direction of each laboratory's QAO as follows:

- The laboratory will check for the attainment of QC criteria as outlined in the various SOPs.

- The laboratory will assess the validity of analytical data by comparing the analytical results of duplicate, MS/MSD, and blank samples.

- The laboratories will critique their own analytical programs by using spiked addition recoveries, established detection limits, and precision and accuracy control charts and by keeping accurate records of calibrations.

The Remedial Contractor Quality Control Manager will conduct data validation independent of the laboratory in accordance with the procedures established in the most current data validation guidelines for DQO Level III. Independent data validation will include:

- An assessment of whether the samples were properly collected and handled according to the Field Sampling Plan (FSP) and Section 5.0 of the QAPP.

- A check on received results against chain-of-custody records to determine completeness.

- A check on the comparability of field duplicates and an evaluation of contamination in field blanks.

- Review of internal laboratory QA/QC as outlined within appropriate methodology and individual laboratory Standard Operating Procedures (SOPs).

- An evaluation of the laboratory's ability to meet quality control criteria for:

    - Initial and continuing calibrations
    - Spiked sample results (surrogates, matrix spikes, LCS samples)
    - Comparability of laboratory duplicates
    - Evaluation of laboratory method blank results
    - Correct compound identification
    - Proper compound quantitation
    - Correct transcription of analytical results

Additional validation effort may be recognized after selection of the laboratories which will provide the necessary analytical work in order to characterize unwanted material and debris for disposal options. Any waste which is intended for disposal as a Special Waste through IDEM will have validated data presented along with application to IDEM's Special Waste Group and the IDEM Remedial Project Coordinator.

9.3 Reporting

Reporting of chemical and physical results on particular waste for removal will include the following:

- Cover sheets listing the samples included in the report.
- Tabulated results on wastes analyzed for TCLP parameters.
- Analytical results for QC sample spikes, sample duplicates, and rinsate and trip blanks.

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10.0 PERFORMANCE AND SYSTEM AUDITS

The Remedial Contractor Quality Control Manager for the ECC Site will monitor and audit the performance of QA/QC procedures to ensure that the SPMR activities are executed in accordance with the FSP and this QAPP.

10.1 Field Activities

QA audits of field measurements, sample collection, and sample custody procedures will be conducted by the Remedial Contractor Quality Control Manager or by an appointed alternate on a periodic basis to document that field activities are performed in accordance with the FSP and this QAPP. These audits will be scheduled to allow oversight of as many field activities as possible. An initial audit will be conducted at the start of the project to ensure that all established procedures are being followed. Subsequent periodic audits will be made to ensure continued quality sampling and to correct any deficiencies.

The field audits will include an evaluation of sampling methods; sample handling and packaging; equipment use; equipment decontamination, maintenance, and calibration procedures; and chain-of-custody procedures. In addition, all records and documentation procedures will be reviewed to ensure compliance with the project requirements. Any deviations from the FSP or the QAPP will be recorded in the field notebook by the person conducting the audit, who will then inform the personnel involved in the activity of the problem and notify the Resident Superintendent for initiation of any necessary corrective action procedures.

10.2 Laboratory

All subcontractor laboratories used during the SPMR phase shall complete their own internal procedural and system audits as discussed in Section 6.2 of this QAPP. The Remedial Contractor will inform each chosen laboratory that the Remedial Contractor Quality Control Manager, representatives of U.S. EPA Region V Central Regional Laboratory, and IDEM reserve the right to perform independent audits at any period of time before, during, and after the project activities.

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11.0 PREVENTATIVE MAINTENANCE

11.1 Field Equipment

Preventative maintenance procedures for field equipment will be those recommended by the manufacturers. Field instruments will be checked and calibrated by the supplier prior to shipment and in the field as described in Section 6.1.

Critical spare parts will be kept onsite to minimize instrument down time. Back-up equipment will be available by 1-day shipment.

11.2 Laboratory Equipment

As part of their QA/QC program, the laboratories should be performing routine preventative maintenance to minimize the occurrence of instrument failure and other system malfunctions. The laboratories should have a designated internal group who are responsible for performing routine scheduled maintenance and repairing or coordinating the repair of all instruments with the appropriate vendor. All laboratory instruments should be maintained in accordance with the manufacturer's specifications and the requirements of the specific method being employed. This maintenance program should be carried out on a regular, scheduled basis, and documented in the laboratory service logbook for each instrument. Information detailing the type of maintenance to be performed and the frequency will be included in the laboratory QAP which will be attached to the project QAPP upon selection of the laboratory.

12.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

12.1 Field Measurements

Field data will be assessed by the Resident Superintendent, who will review the field calibration logs and frequency as specified in the FSP and this QAPP. The accuracy of field measurements will be evaluated by using daily instrument calibration, and calibration checks.

12.2 Laboratory Data

Laboratory results will be assessed for compliance with the required precision, accuracy, completeness, and sensitivity as described in the following subsections.

12.2.1 Precision

The precision of laboratory analyses will be assessed by comparing the analytical results between matrix spike (MS) samples for organic analyses, and laboratory duplicate results for inorganic analyses.

The relative percent difference (%RPD) will be calculated for each pair of duplicate analyses by using Equation 12-1:

$$\%RPD = \frac{S - D}{(S + D)/2} \times 100 \qquad \text{(Equation 12-1)}$$

Where:

S	=	First sample value (original or MS value)
D	=	Second sample value (duplicate or MSD value)

12.2.2 Accuracy

The accuracy of laboratory results will be assessed by using the analytical results of method blanks, reagent/preparation blanks, MS samples, and rinsate blanks. The percent recovery (%R) of MS samples will be calculated using Equation 12-2:

$$\%R = \frac{A - B}{C} \times 100 \qquad \text{(Equation 12-2)}$$

Where:

A = The analyte concentration determined experimentally from the spiked sample

B = The background level determined by a separate analysis of the unspiked sample

C = The amount of the spike added

12.2.3 Completeness

The data completeness of laboratory analytical results will be assessed for compliance with the amount of data required for decision making. Data completeness will be calculated by using Equation 12-3:

$$\% \ Completeness = \frac{Useable\ Data\ Obtained}{Total\ Data\ Realized}$$

(Equation 12-3)

12.2.4 Sensitivity

The achievement of method detection limits depends on the instrument's sensitivity and matrix effects. Therefore, it is important to monitor the instrument's sensitivity to ensure the data quality through appropriate instrument performance. The instrument's sensitivity will be monitored through the analysis of method blanks, calibration check samples, and laboratory control samples.

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13.0 CORRECTIVE ACTION

Corrective actions may be required for two classes of problems: sampling and analytical problems and noncompliance problems. Sampling and analytical problems may occur or be identified during the collection, handling, or preparation of a sample; laboratory instrument analysis; and data review.

For problems of noncompliance with the QAPP or the FSP, a corrective action program will be defined in accordance with this QAPP and implemented at the time the problem is identified. The person who identifies the problem is responsible for notifying the Contractor's Resident Superintendent or Project Manager. Implementation of the corrective action will be confirmed in writing through the same channels.

Corrective actions will be implemented and documented in the field logbook. No staff member will initiate corrective action without prior communication of findings through the proper channels. If corrective actions are insufficient, work may be stopped by a stop-work order from the U.S. EPA or IDEM.

13.1 Sample Collection/Field Measurements

Technical staff and project personnel will be responsible for reporting all suspected technical or QA nonconformances, or suspected deficiencies of any activity or issued document by reporting the situation to the Contractor Quality Control Manager. The Resident Superintendent will discuss the suspected problems with the Contractor's Project Manager and Quality Control Manager and if necessary with the ECC Trust, who will then make a decision based on the potential for the situation to affect the quality of the data. If it is determined that the situation is a reportable nonconformance requiring corrective action, the U.S. EPA and IDEM will be notified, and a nonconformance report will be initiated by the Contractor's Project Manager.

The Contractor's Project Manager will be responsible for ensuring that any corrective action for nonconformances is initiated by:

- Evaluating all reported nonconformances.
- Controlling additional work on nonconforming items.
- Determining disposition or action to be taken, in consultation with the ECC Trust if necessary and, if warranted by the situation, with the U.S. EPA and IDEM.
- Maintaining a log of nonconformances.
- Reviewing nonconformance reports and corrective actions taken.
- Ensuring that nonconformance reports are included in the final site documentation in project files.

If appropriate, the Project Manager will ensure that no additional work that is dependent on the nonconforming activity is performed until the corrective actions are completed.

Corrective actions for field measurements may include:

- Repeating the measurement to check the error
- Checking batteries
- Checking the calibration of the instrument
- Recalibrating the instrument
- Replacing the instrument or measurement devices
- Stopping work (if necessary)

The Resident Superintendent will be responsible for all site activities. In this role, the Resident Superintendent may have to adjust the site programs to accommodate site-specific needs. When it becomes necessary to modify a program, the Resident Superintendent will notify the Contractor's Project Manager of the anticipated change and will implement the necessary changes after obtaining the approval of the agencies. The change in the program will be documented on a Corrective Action Request (CAR) form that will be signed by the Resident Superintendent. The CARs will be numbered serially, as required, and will be attached to the file copy of the affected document. The U.S. EPA and IDEM must approve the change in writing or verbally prior to field implementation, if feasible. Otherwise, the action taken during the period of modification will be evaluated to determine the significance of any departure from established program practices or the actions taken.

The Contractor's Project Manager is responsible for controlling, tracking, and implementing the identified changes. Reports on all changes will be distributed to all affected parties, including the U.S. EPA and IDEM. The U.S. EPA and IDEM will be notified whenever program changes are made in the field.

13.2 Laboratory Analyses

Corrective actions at the laboratories will be required whenever an out-of-control event or potential out-of-control event is noted. The investigative action taken will be somewhat dependent on the analysis and the event. Laboratory personnel will be alerted that corrective actions may be necessary if:

- QC data are outside the warning or acceptable windows for precision and accuracy.
- Blanks contain target analytes above acceptable levels.
- Undesirable trends are detected in spike recoveries or in the %RPD between duplicates or MS.

- Unusual changes in detection limits are identified.

- Deficiencies are detected by the QA department during internal or external audits or from the results of performance evaluation samples if used.

- Inquiries concerning data quality are received.

Corrective action procedures will often be handled at the bench level by the analyst, who will review the preparation or extraction procedure for possible errors; check the instrument calibration, spike and calibration mixes, and instrument sensitivity; and conduct other QA/QC reviews. If the problem persists or cannot be identified, the matter will be referred to the laboratory supervisor, Project Manager, and/or QA department for further investigation. Once resolved, full documentation of the corrective action procedure will be filed with the QA department. If the problem requires resampling or is not correctable in the laboratory, the laboratory QAO will notify the Contractor's Project Manager. The Contractor's Project Manager will decide, in consultation with the ECC Trust and (if warranted by the significance of the problem) with the U.S. EPA and IDEM, the corrective actions to be implemented.

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14.0 QUALITY ASSURANCE REPORT

Quality Assurance reports will be issued by the Remedial Contractor. These documents will: (1) contain information that summarizes the QA activities in both the field and the laboratory, including audit results; (2) discuss any quality issues that required corrective action and document the corrective action that was taken; and (3) note any project problems that have occurred and any QA/QC issues that have been satisfactorily completed. Any problem serious enough to require significant actions (e.g., changing from an approved laboratory) will be reported to the U.S. EPA and IDEM within 5 days of the occurrence.

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15.0 REFERENCES

ERM-North Central, March 1992. "Remedial Action Sampling and Analysis Plan, Environmental Conservation and Chemical Corporation," Indiana.

CH2M Hill, 1983. "Remedial Action Master Plan, Environmental Conservation and Chemical Corporation," 01-5V30.

CH2M Hill, 1986. "Final Remedial Investigation Report. Environmental Conservation and Chemical Corporation, Indiana."

U.S. EPA, 1980. "Internal Guidelines and Specifications for Preparing Quality Assurance Project Plans," QAMS-005/80, Washington, D.C..

U.S. EPA, March 1987. "Data Quality Objectives for Remedial Response Activities," EPA 540/6-87/003.

U.S. EPA, Region V, January 1992. "U.S. EPA Region V QAPP Element Checklist".

U.S. EPA, May 1991. "Model Quality Assurance Project Plan," Region V, Office of RCRA.

U.S. EPA, May 1985. "Guidance Document for Cleanup of Surface Tank and Drum Sites," Camp, Dresser, and McKee, Inc., Boston, Massachusetts.

APPENDIX A

FIELD SAMPLING PLAN

FIELD SAMPLING PLAN

SITE PREPARATION AND MATERIAL REMOVAL

FINAL DESIGN
ENVIRO-CHEM SUPERFUND SITE
ZIONSVILLE, INDIANA

Prepared For:

ENVIRONMENTAL CONSERVATION AND CHEMICAL CORPORATION TRUST

Prepared By:

AWD TECHNOLOGIES, INC.
INDIANAPOLIS, INDIANA

AWD PROJECT NUMBER 2259

MAY 1993

NOTICE

This document is a portion of the overall design package and, therefore, cannot be referenced, in whole or in part, as a standalone document for any other purpose.

TABLE OF CONTENTS

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FIGURES

1.0 INTRODUCTION

This Field Sampling Plan (FSP) has been developed and is being submitted as a Final (100%) Design for the Site Preparation and Material Removal (SPMR) phase of the Remedial Actions to be conducted at the Environmental Conservation and Chemical Corporation Site (ECC Site), located in Zionsville, Indiana.

ERM-North Central has previously submitted a number of versions of a two-part Sampling and Analysis Plan for the ECC Site which contained a Part I - Field Sampling Plan and a Part II - Quality Assurance Project Plan. The Sampling and Analysis Plan addressed site preparation, material removal and remedial action activities, although the plan primarily focused on remedial action activities.

The previous ERM-North Central submittals of the Sampling and Analysis Plans and the corresponding U.S. EPA Region V comments are as follows:

1. Sampling and Analysis Plan, Revision 0, March 1, 1989
2. Sampling and Analysis Plan, Revision 1, December 10, 1991
3. U.S. EPA Region V Comments on Revision 1, February 21, 1992
4. Sampling and Analysis Plan, Revision 2, March 24, 1992

AWD Technologies, Inc. (AWD) has revised the ERM-North Central Sampling and Analysis Plan, Revision 2, to further address the U.S. EPA comments. The previous Sampling and Analysis Plan two-part format has been modified to include the Field Sampling Plan as part of the Quality Assurance Project Plans. The Sampling and Analysis Plan terminology is not used in the AWD plans.

The Final Design for the ECC Site has been further modified to include two design packages: (1) Site Preparation and Material Removal and (2) Remedial Action. The Site Preparation and Material Removal phase includes preparation of the support zone and removal of above ground tanks, buildings, and miscellaneous debris. The Remedial Action phase includes in-situ soil treatment by soil vapor extraction, capping of the soil treatment area, and verification and compliance monitoring.

This FSP is intended to cover all necessary sampling and analytical procedures to be implemented during preparation of the site when removal of obstructing and miscellaneous materials and debris will occur. This FSP is designed to provide adequate classification and profiling of the materials listed in Appendix A of the Contract Technical Specifications in order to satisfy acceptance criteria for offsite disposal facilities.

2.0 PROJECT DESCRIPTION

2.1 Site Location

The ECC Site is located in a rural area of Boone County, about 5 miles north of Zionsville and 10 miles northwest of Indianapolis, Indiana (Figures 2-1 and 2-2).

2.2 Site Description

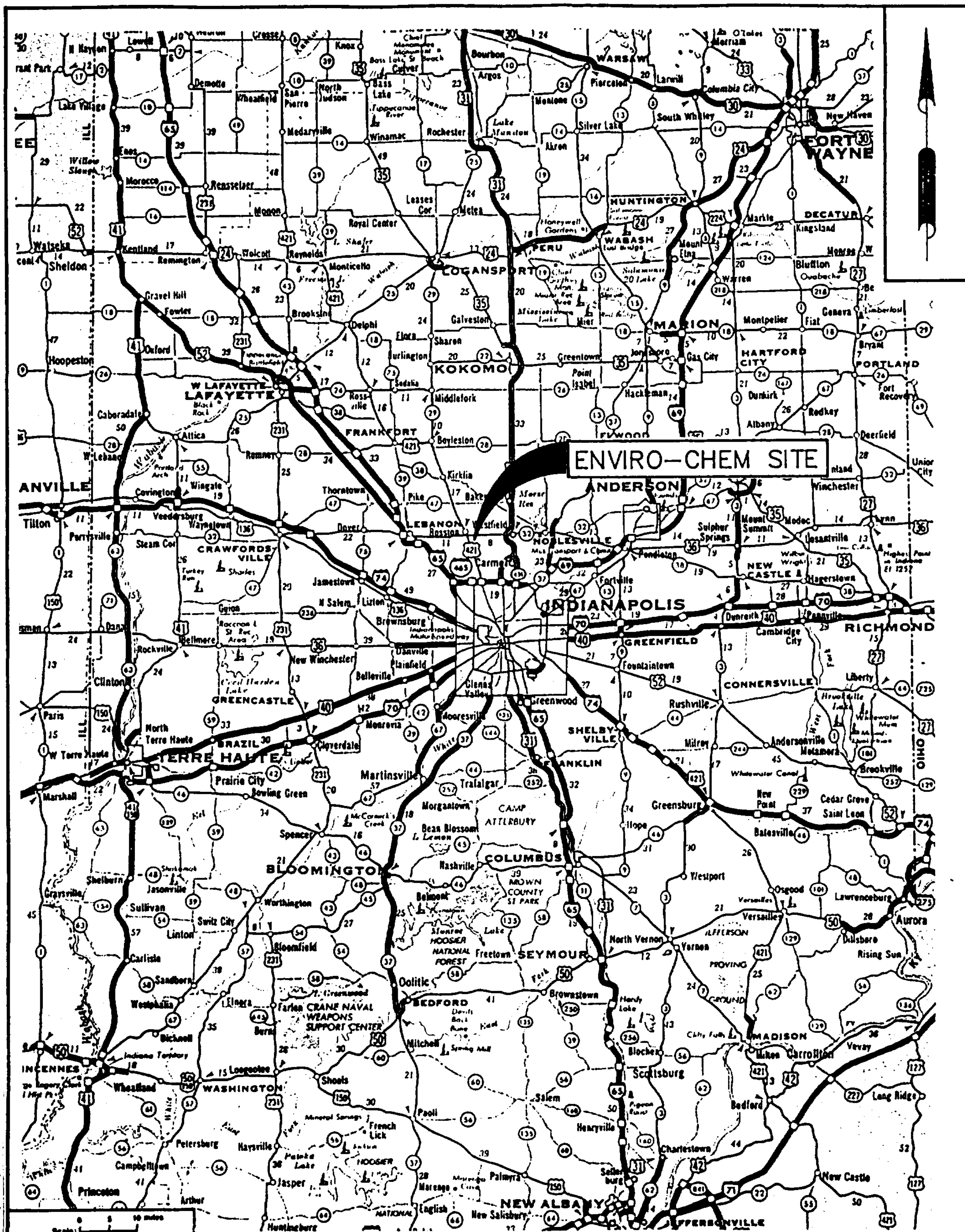
The Site is defined as the area bounded by the proposed perimeter fence, which includes the 3.053-acre remedial boundary the support zone, and the buffer zone between the proposed fence and the north and eastern sides of the Site. A buffer zone on the southern side of the Site contains a proposed Remedial Contractor equipment laydown area.

Directly west of the Site is an active commercial waste handling and recycling facility operated by the Boone County Resource Recovery Systems, Inc. (BCRRS). Access to the Site will be from State Route 421 and will be shared with BCRRS.

Directly east of the Site across an unnamed ditch is the inactive Northside Sanitary Landfill (NSL) landfill. This facility is also a Superfund Site and is presently undergoing remedial design activities. The south end of the Site is approximately 500 feet from an existing residence and is approximately 400 feet from Finley Creek, the main surface water drainage in the site area.

Residential properties are also located to the north and west, within 1/2 mile of the facilities. A small residential community, Northfield, is located north of the Site on State Route 421. Approximately 50 residences are located within 1 mile of the sites.

The Site is in an area that is gently sloping, predominantly to the east toward the unnamed ditch. The unnamed ditch runs north to south along the eastern edge of the Site and drains the Site either directly or from tributary ditches on the north and south ends of the Site. The unnamed ditch flows south from the Site to Finley Creek.



AWD TECHNOLOGIES, INC	SITE LOCATION MAP		
	ENVIRO-CHEM SUPERFUND SITE		ZIONSVILLE, IN
	CLIENT: ENVIRONMENTAL CONSERVATION & CHEMICAL CORP. TRUST		JOB NUMBER: 2259-552
	SCALE: AS SHOWN	FIGURE NUMBER 2-1	REV 0

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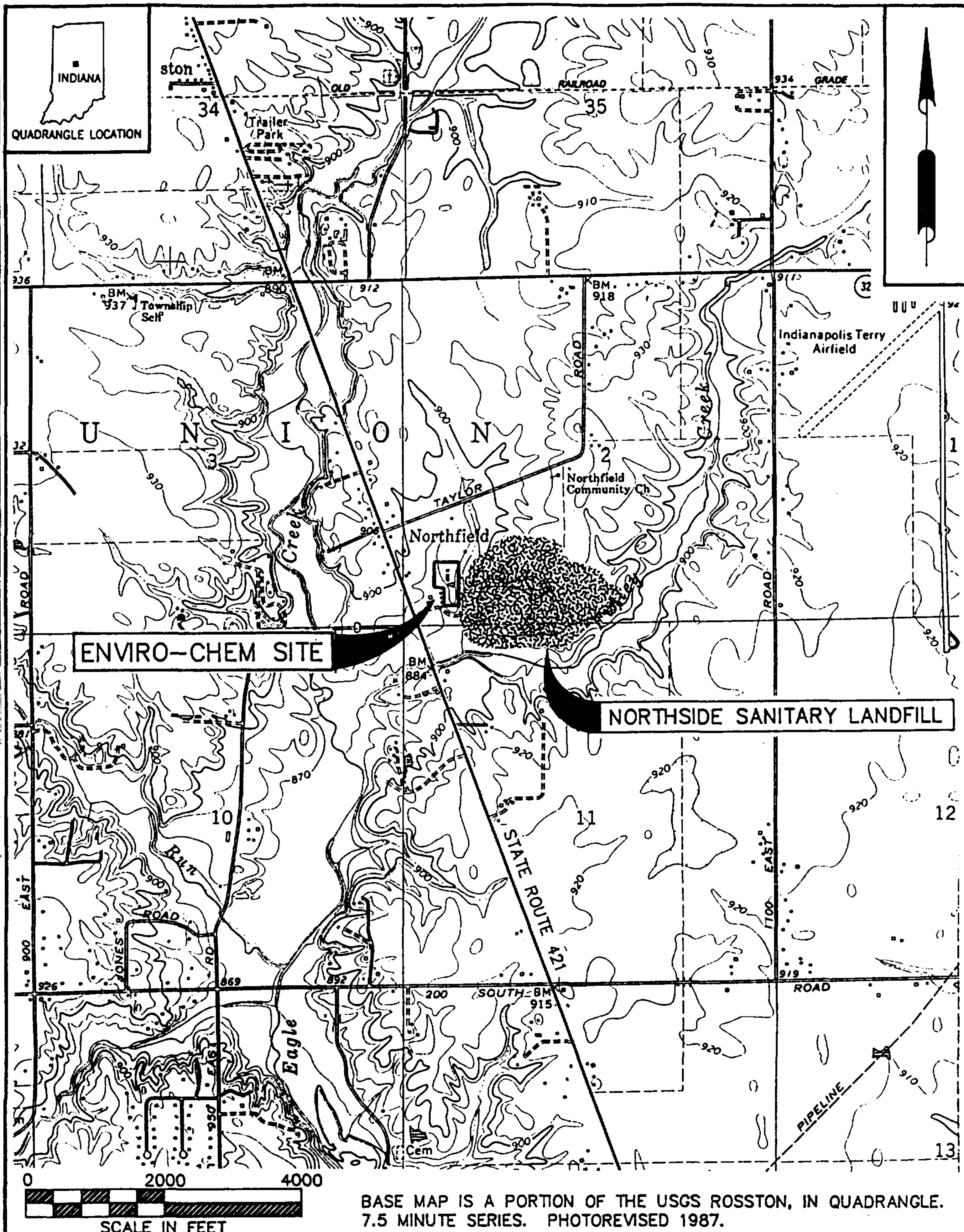

BASE MAP IS A PORTION OF THE USGS ROSSTON, IN QUADRANGLE. 7.5 MINUTE SERIES. PHOTOREVISED 1987.

FILE:\ECC\2-2_552.DWG

AWD TECHNOLOGIES, INC	SITE MAP
AWD TECHNOLOGIES	ENVIRO-CHEM SUPERFUND SITE — ZIONSVILLE, IN
	CLIENT: ENVIRONMENTAL CONSERVATION & CHEMICAL CORP. TRUST — JOB NUMBER: 2259-552
	SCALE: AS SHOWN — FIGURE NUMBER 2-2 — REV 0

0051909033 NORTH

Various solid waste materials are present at the Site both within the remedial boundary and within the support zone. Emergency actions undertaken prior to 1990 have resulted in the removal of the major sources of contamination. The materials at the Site include cleaned tanks, the process building, the A-frame structure, the concrete pad with approximately 250 drums, and miscellaneous debris.

2.3 Summary of Work

The Site Preparation and Material Removal phase includes the following:

- Preparation of a site support zone which will consist of facilities to support the materials removal efforts and subsequent corrective actions; placement of temporary controls; and design and layout of ingress, egress (personnel and traffic), and materials handling and storage areas.

- Remove physical obstructions including tanks, buildings, debris, and any other above ground obstructions prior to initiation of remedial design construction.

Sampling and analyses will be performed on selected materials for removal based on visual classifications, field screening, and RCRA waste characterization.

3.0 FIELD SAMPLING PLAN OBJECTIVES

3.1 Objectives

The objectives of the FSP are to:

1. Describe applicable procedures for the collection of representative samples from waste and debris for subsequent characterization and offsite disposal.

2. To assure that samples are collected in a fashion that will provide the highest level of confidence in subsequent testing and results so that material waste and debris can be directed toward appropriate disposition.

4.0 MATERIAL AND DEBRIS HANDLING AND STAGING

4.1 General

Items which will be handled during the SPMR phase of the site remedy will fall into three general categories of materials including (1) RCRA regulated hazardous waste, (2) special waste, and (3) excluded materials including salvage material. In accordance with state regulations for the purposes of SPMR and meetings with IDEM, not all debris will be handled as special waste which is outlined within 329 IAC 2-21.

The following is a breakdown on how items will be handled and removed (disposed) from the site as discussed and agreed upon with IDEM during the design effort.

4.2 Tanks

Presently 53 used process tanks are staged on the west side of the ECC property (Appendix A, Table 1). Additionally, there are a few smaller volume fuel tanks which are among the building and outside debris. The old process tanks will be handled according to Section 02081 - Tanks and Figure 1 in Appendix C of the Site Preparation and Material Removal Technical Specifications. The miscellaneous small fuel tanks will be checked for any content, and the content removed and staged for sampling if required.

IDEM agrees that salvage of metal and salvageable materials is the best final deposition of this material. Salvageable metals that can be decontaminated, including such items as the cut up tanks may be salvaged with no formal notice or approval from IDEM required. All materials slated for salvage will be decontaminated and decontamination records maintained.

4.3 Bulked Liquids

Onsite bulking of liquid waste will be the greatest volume for handling and disposal considerations. Liquid waste will originate from SPMR decontamination activities and liquids pumped from other onsite vessels and structures being removed. Liquids will continually be bulked in an onsite liquid hazardous waste tanker supplied by the liquid treatment facility or other licensed general hauler. Initial profiling should be completed using the chemical information presented in Table 1-1 of the SPMR QAPP since it is anticipated that accumulated waters within onsite features and decontamination waters will present no great deviation in characteristics or concentration from those ranges recognized from the Remedial Investigation.

Sampling of the hazardous waste tanker may be required by the TSD facility per load for verification. When it is suspected that decontamination activities may produce wastewater which would alter the composition of the bulked liquids then a sample will be required for laboratory characterization prior to bulking. These waters will be held separately until found compatible with the tanker liquids and/or acceptable to the liquid waste treatment facility.

4.4 Process Building

Tables 3 through 6 in Appendix A show the materials and debris which exist inside the onsite buildings, in miscellaneous debris areas, and associated with past investigative activities. Most of the materials and debris are anticipated to be disposed of as solid nonhazardous waste, or salvaged and/or recycled.

The non-metallic materials which make up the process building (i.e., block, roofing materials, wood, etc.) will be handled according to the following:

- Block, brick, concrete, wood, and miscellaneous materials associated with the old process building will be sampled by compositing similar materials and analyzing them for RCRA toxicity characteristics. Analytical results will be submitted to the Indiana Department of Environmental Management (IDEM) Special Waste section for anticipated one-time disposal approval into an IDEM permitted waste landfill approved for acceptance of special waste.

- The large boiler within room 1 of the process building will be handled as hazardous waste and disposed of accordingly. Prior to removal of the boiler, the insulation materials and brick within the boiler shall be sampled and analyzed to confirm the absence of asbestos. "Grab" samples of the insulation materials and brick shall be collected by drilling, chipping, or cutting these materials as necessary to obtain a suitable sample volume for preparation of the composite samples.

4.5 Miscellaneous

Certain items such as herbicides, pesticides, paints, etc. shall be placed in laboratory packs and placed on the southern concrete pad pending laboratory analysis for disposal. Pesticides and herbicides shall be disposed of in accordance with the requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Samples from these items may be required, and will be coordinated between the Remedial Contractor and the TSD facility for sampling and profiling.

Removal of the transformer by the local utility company for reuse or recycling is allowable. The utility (or whomever removes the transformer from the pole) must follow the contractor's Health and Safety Plan when going onto the site.

Non-leaking fluorescent light ballasts may be disposed of as general solid waste in groups of 25 or less at a time. Multiple shipments of 25 or fewer ballasts is acceptable to meet this requirement. If more than 25 ballasts are disposed of in one shipment, special waste approval must be obtained from IDEM.

Any leaking fluorescent light ballasts containing PCBs must be disposed of in accordance with TSCA regulations or 329 IAC 4.

Fluorescent tubes must be handled as RCRA hazardous waste. IDEM has historical information that 50 percent of fluorescent tubes tested have failed TCLP for Cd, Pb, and/or Hg.

If the Contractor has reason to believe that surface debris is contaminated when slated for disposal, Special Waste certification will be obtained prior to disposal. This will apply to materials that cannot be decontaminated, excluding wood, brick, etc.

Any material contaminated by listed hazardous waste which, when tested, has detectable hazardous waste constituents, will be handled as a hazardous waste for disposal (mixture rule).

5.0 SAMPLING EQUIPMENT AND PROCEDURES

5.1 Bulked Liquids (Tanker)

5.1.1 Liquid Waste Tanker Sampling Equipment

- Bailers
- Open tube samplers
- Pond samplers
- 250 ml glass beakers
- PVC pipe of sufficient strength
- Wrenches

5.1.2 Procedures

Field sampling procedures for collecting tanker content samples using an open tube sampler, pond sampler, or an open bucket sampler are as follows:

1. Gain access (e.g., steps, ladders, man-lift, etc.) to the tanker's top.

2. Slowly open release valve (if any) to bring the tanker to atmospheric pressure.

3. Loosen access port/cover bolts and remove port/cover.

4. If no access port/cover is available, unscrew cap of top opening.

5. Insert a decontaminated sampling device into tanker slowly to allow stratified content (if any) to fill the sampler. (Note: Samples will be collected at different horizontal and vertical points.)

6. Retrieve the sampling device and wipe it with a disposable absorbent pad (place the pad in appropriate container).

7. Transfer the sample(s) into appropriate containers.

8. Repeat Step 5 until enough sample volume is obtained, as required.

9. Cap the sample container tightly and place in container carrier, make sure sample has been labeled and identified.

10. Replace cap or access cover and secure.

If sample collection from the bottom valve is required, the following additional steps will be included:

1. Make sure that sampling is carried out on the wastewater storage pad.

2. Place sample container beneath the valve.

3. Open valve slowly to ensure a slow, controlled flow of material.

4. After obtaining enough material, close valve securely.

5. Cap the sample container tightly and place in container carrier. Make sure sample has been labeled and identified.

6. Check valve for any signs of leaking.

5.2 Building Materials (Structural Non-Metal)

5.2.1 Structural Materials Sampling Equipment

- Hammers
- Chisels
- Masonry saw and blades
- Masonry drills
- Ladders

5.2.2 Procedures

This sampling approach must be submitted and reviewed by IDEM, and will consist of physically (i.e., drilling, hammering, cutting, etc.) "grab" sampling representative specimens of the structural nonmetallic portions of the building. This may include composite sampling of suspected or visually contaminated areas.

- Visually inspect process building masonry walls and other structures for visually contaminated surfaces. (It is anticipated that the boiler room may be an ideal area to conduct multiple sampling since it is recorded that solvents were burned here.)

- Plan out a representative sampling approach to any adjacent large areas stained or suspect.

- At least one sample per wall per room will be composited for subsequent analysis.

- Remove representative portions of cinder block, brick, concrete.

- Collect pieces which have been unaffected by the destructive sampling (unscarified surface).

- Place pieces into appropriate sample containers.

5.3 Other Sampling Equipment

The following equipment may be used for some, if not all sampling activities:

- Vacuum pumps
- Tool box (miscellaneous tools)
- Sample containers
- Latex gloves
- Water (potable, distilled)
- Vermiculite (packing material)

- Sample labels
- Indelible markers
- Duct tape
- Plastic bags (trash, sandwich, Ziploc, etc)
- Clamps (stainless steel or Teflon)
- Rope, cord
- Paper towels
- Spatulas
- Brushes
- Paint cans (1 gallon, empty)
- Plastic sheeting (Visqueen)
- Sorbent pads
- Utility knife

5.4 Other Sampling Activities

The Sampling Team Leader will be responsible for recording all pertinent information into the sample logbook. At a minimum this will include the following:

- Sample location
- Sample number
- Material phase (i.e., solid, liquid, sludge, etc.)
- Sample time
- Sampler's initials
- Other important observations

The above is in addition to other entries made at the start of each work day. Once sampling has been completed in a particular building(s), the Sampling Team Leader will be responsible for delivering the samples to the sample receiving area at the decontamination pad. The Sampling Team Leader will then complete a chain-of-custody form and assist in readying the samples for shipment. This will involve documentation of sample numbers, date, time, and preservatives, as appropriate, as well as packing the "coolers" for shipment. Samples will be shipped on a daily basis so that analysis can be performed within required holding times.

5.5 Sample Frequency

Sample frequency and quantities are presented in Table 7-1 of the SPMR QAPP. Most sampling frequencies will be a field determination by the Remedial Contractor based on the characteristics of the materials with respect to visual classification (drums), field organic vapor screening, and RCRA waste characteristics.

6.0 SAMPLING EQUIPMENT DECONTAMINATION

6.1 General

The following describes standard operating procedures for the decontamination of equipment and tools that may come into direct contact with a field sample intended for analytical analysis. This procedure only addresses the decontamination of equipment as it pertains to the chemical integrity of samples for analysis and is not intended for use in health and safety decontamination of personnel, materials, and equipment that may become contaminated during field operations.

6.2 Applicability

Decontamination of all analytical devices, sampling tools, and storage equipment that may come into direct contact with a field sample are necessary in order to achieve analytical results that are representative of true field conditions.

The decontamination procedures below may be modified as long as the chemical integrity of the field sample is maintained within the analytical detection limits and the sample source is not permanently compromised. Anticipated contaminates and concentrations, media (water, soil, etc.), surface area of possible cross contamination, method of sampling, and many other factors will be considered when establishing a sampling equipment decontamination procedure. Any modification of the procedures below will be carefully thought out, approved by the Construction Manager, and documented accordingly.

6.3 Procedures

All equipment will be considered contaminated unless determined otherwise. In order to provide consistency to the decontamination procedure, a designated sampling team crew member will be responsible for equipment decontamination. Similarly, it is desirable to decontaminate all the equipment necessary for a field task in the laboratory prior to mobilization. In this way, field decontamination will be limited.

6.3.1 Decontamination Equipment List

The following equipment is needed for equipment decontamination:

- Clean disposable rubber gloves
- Wastewater container (drum)
- Clean water spraying device
- Clean brushes
- Plastic garbage bags
- Ten percent nitric acid solution in squirt bottle (squirt bottle is not recommended for transportation)
- Acetone or methanol in squirt bottle (squirt bottle is not recommended for transportation)
- Deionized/distilled water (DI water)
- Clean buckets and other containers, as needed (small plastic swimming pool)
- Plastic ground sheet (Visqueen)
- Aluminum foil
- Package labels and pen
- Potable water, warm if available
- Steam cleaner (optional)

6.3.2 General Equipment Decontamination Procedure

The following steps will be considered the general equipment decontamination procedure:

- Cover hands with disposable rubber gloves.
- Wash and scrub as necessary with a solution of non-phosphate detergent and potable water (warm water if available). Thorough steam cleaning may be used as a substitute for this step.
- Rinse thoroughly with potable water (warm water if available).
- Rinse with 10 percent nitric acid solution.
- Rinse with DI water.
- Rinse with hexane or methanol.
- Rinse with DI water.
- Air dry.

The nitric acid rinse is only required if inorganic (i.e., metals and general chemistry parameters) analysis is intended for the sample. The solvent rinse is only required for organic analysis.

All waste liquids and solids generated by the decontamination procedure will be containerized and disposed of properly.

Decontaminated equipment not intended for immediate use may be placed in plastic bags and sealed. All handling of decontaminated equipment will be performed using disposable rubber gloves. Care will be exercised in the storage of decontaminated equipment. Sampling personnel will avoid solvents, greases, oils, gasoline, water, dusts, and other potential sources that might contaminate the equipment before use.

7.0 SAMPLE HANDLING AND TRACKING

7.1 Sample Identification

Each sample collected will be assigned a unique identification number and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date, time of sample collection, site name, type of sample, and sampler's name recorded on the label. In addition, this label will contain the sample identification number, analysis required and chemical preservative added, if any. All documentation will be completed in waterproof ink.

The sample identification number will be a unique alphanumeric code which will identify the project site, sample location, sample type, and sample number. The sample ID for specific locations will have the following for group identifiers:

Site Code - Sample Location - Sample Type - Sample Number

The alphanumeric code for each sample will initiate with the three-letter project site code for the Environmental Conservation and Chemical Corporation Trust (ECC Trust). This will be followed by the sample locations which will be identified by a two-digit number corresponding to the inventory followed by an A1-6 if located in any of the debris areas.

The sample type identifiers will be as follows:

- PBM - Process Building Material
- TK - Tanker Content

For example, the first sample from the process building will be identified as:

ECC-04A1-PBM - 01

This is an optional identification tracking system, the Remedial Contractor may create a different approach which should be documented and approved by the Engineer. Movement of materials during segregation and staging would necessitate the updating of the inventory tables, if the above system is used.

7.2 Field Documentation

Field notebooks will be maintained by the Sampling Team Leader to record all data collecting activities performed at the site. Entries will be as descriptive and detailed as necessary so that a particular situation can be reconstructed without reliance on the collector's memory. The cover of each book will contain the following information:

- Project name and number
- Project location
- Book number
- Activity type
- Start date
- Stop date

At a minimum, entries will consist of the following:

- Date
- Start date
- Weather
- Field personnel present
- Signature of the person making the entry
- Type of activity conducted
- Sampling location
- Sample identification number
- Description of depth of sampling point
- Type of sample (matrix)
- Pertinent field observations

All measurements made and samples collected will be recorded. All entries will be made in indelible ink. No erasures will be permitted. If an incorrect entry is made, the data will be crossed out with a single strike mark and initialed. Entries will be organized into easily understandable tables, if possible.

7.3 Chain-of-Custody

To maintain and document sample possession, the following chain-of-custody procedures will be followed. A chain-of-custody record will be completed once the samples are brought to the on-site sample receiving area. This record will include, but not be limited to, the following information:

- Project name and number
- Name(s) of sampler
- Sample identification number and location
- Date and time of collection
- Number and type of containers
- Required analyses
- Preservatives
- Courier
- Signatures documenting change of sample custody

Chain-of-custody forms will accompany any and all samples which are shipped off-site. When transferring possession of the samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of transfer on the record. A commercial delivery service (for example, Federal Express) will be identified by company name only. Additionally, the samples will remain in the physical possession of the person assigned to the sample until they are shipped to the laboratory or will be placed in a locked storage facility prior to shipping. The original chain-of-custody record will accompany the sample to the analytical laboratory and will be returned to the Remedial Contractor with the analytical results. A copy of each record will be placed in the project file.

7.4 Sample Packaging and Shipping

Samples will be shipped by overnight courier as environmental samples according to applicable guidance documents and DOT regulations. Sample containers will be prepared according to the U.S. EPA's Specifications and Guidance for Contaminant Free Sample Containers, April 1990. This document is attached to Appendix C to the QAPP.

7.4.1 Environmental Samples

Sample packaging and shipping procedures are described below:

- Secure sample bottle lids with strapping tape or evidence tape. Check that sample label is securely attached.
- Mark volume level on bottle with grease pencil.
- Place bottles in plastic bags.
- Place about 3 inches of inert cushioning material such as vermiculite in bottom of cooler.
- Place containers in cooler in such a way that they do not touch.
- Put VOA vials in Ziploc bag and place them in the center of the cooler.
- Pack plastic Ziploc bags with ice and place in cooler.
- Fill cooler with cushioning material.
- Put paperwork in plastic bags and tape to inside lid of cooler.
- Tape drain shut.
- After acceptance by Federal Express or shipper, wrap cooler completely with strapping tape at two locations. Do not cover any labels.

- Place lab address on top of cooler.

- Put "THIS SIDE UP" labels on all four sides and "FRAGILE" labels on at least two sides. ("FRAGILE" labels are optional for coolers not containing glass bottles.)

- Affix signed custody seals on front right and back left of cooler. Cover seals with wide, clear tape.

7.4.2 Medium or High Concentration Hazardous Waste Samples

Samples from unclassified drums may require packaging and shipping according to applicable guidance documents and DOT regulations for medium or high concentration hazardous waste samples. Sample packaging and shipping are described below:

- Secure sample jar lids with strapping tape or evidence tape.

- Position jar in Ziploc bag so that tags may be read and seal bag.

- Place 1/2 inch of cushioning material in the bottom of metal can.

- Place jar in can and fill remaining volume of can with cushioning material.

- Close the can using three clips equally spaced to secure the lid.

- Write sample identification number on can lid. Indicate "THIS SIDE UP" by drawing an arrow and place "FLAMMABLE LIQUID N.O.S." label, if appropriate, on can.

- Place 1 inch of packing material in bottom of cooler.

- Place cans in cooler and fill remaining volume of cooler with packing material.

- Put paperwork in plastic bags and tape to inside lid of cooler.

- Tape drain shut.

- After acceptance by the shipper, tape cooler completely around with strapping tape at two locations. Do not cover any labels.

- Place lab address on top of cooler.

- For all medium and high concentration shipments, complete shipper's hazardous material certification form.

- Put "THIS SIDE UP" labels on all four sides, "FLAMMABLE LIQUID N.O.S." or "FLAMMABLE SOLID N.O.S." and "DANGER-PELIGRO" labels on two sides.

  Note: "DANGER-PELIGRO" labels should be used only when net quantity of samples in cooler exceed 1 quart (32 ounces) for liquids or 25 pounds for solids.

- Affix custody seals on front right and back left of cooler. Cover seals with wide, clear tape.

APPENDIX A1

INVENTORY SUMMARY TABLES

(INVENTORY PERFORMED ON NOVEMBER 13, AND 14, 1992)

TABLE 1

TANK INVENTORY SUMMARY TABLE
PAGE 1 OF 6

Tank Number	Height/Length (Ft)	Diameter (Ft)	Thickness (In)	Condition	Contents	Miscellaneous/Comments
T-1	15.35	10.6	3/16	Fair	Clean and dry	16 feet of 2-inch piping 15 feet of 3-inch piping
T-2	18	10	3/16	Fair	Clean and dry	15 square feet of insulation 5 foot x 5 foot hole cut in side
T-3	30	6	1/4	Good	Unknown	Inaccessible port Riveted steel
T-4	32.2	5.5 avg.	1/8	Poor	Clean and dry	5,000 gallon tanker Truck-back end cut open Stainless steel
T-5	33	5.5 avg.	3/16	Fair	Empty	Tanker truck with baffles
T-6	31.5	10	3/16	Fair	Unknown	Inaccessible port
T-7	24	8	3/16	Poor	Clean and dry	Tank has four 6-foot legs
T-8	23.5	10.5	1/4	Fair	Unknown	Inaccessible port Riveted steel
T-9	20	10	1/4	Poor	Unknown	Inaccessible port Riveted steel

TABLE 1

TANK INVENTORY SUMMARY TABLE

Tank Number	Height/Length (Ft)	Diameter (Ft)	Thickness (In)	Condition	Contents	Miscellaneous/Comments
T-10	27	8	3/16	Fair	Clean and dry	
T-11	25.5	4.25	3/16	Poor	Empty with considerable amount of scale	4,000 gallon vacuum tanker truck on wheels Miscellaneous piping and equipment attached
T-12	24	5.35	3/16	Fair	Empty with minimal scale debris	
T-13	22	8	3/16	Fair	Unknown	Inaccessible port
T-14	18	9.5	3/16	Poor	Chemical scale on interior walls 1 inch clear liquid on bottom	5 foot x 3 foot hole cut 3 foot x 2 foot hole cut
T-15	13.5	7.5	3/16	Fair	Clean and dry	
T-16	16	10.4	1/4	Fair	Clean and dry	Riveted steel
T-17	16	13	3/16	Fair	Clean and dry Minimal scale	
T-18	12	8	3/16	Poor	Puddled water on bottom; otherwise clean	
T-19	12	8	3/16	Poor	Clean and dry	
T-20	21	8	3/16	Fair	Unknown	No visible ports

TABLE 1

TANK INVENTORY SUMMARY TABLE

Tank Number	Height/Length (Ft)	Diameter (Ft)	Thickness (In)	Condition	Contents	Miscellaneous/Comments
T-21	35	7	1/4	Fair	Clean and dry	Riveted steel Scale on interior wall Note on side of tank painted "PCB Hoses Only"
T-22	15.5	10.5	1/8	Poor	Clean and empty Minimal scale	
T-23	21	12.5	3/16	Poor	Clean and dry Minimal scale	
T-24	16	10	3/16	Poor	1 inch liquid Some solid debris Tank scale	
T-25	15	10.5	3/16	Poor	Clean with minimal solid debris and tank scale	
T-26	32.3	5 avg.	1/8	Very poor	Nothing	Tanker truck with side cut out Note on truck: "Licensed Special Waste Hauler - ILL EPA-0295/002"

TABLE 1

TANK INVENTORY SUMMARY TABLE

Tank Number	Height/Length (Ft)	Diameter (Ft)	Thickness (In)	Condition	Contents	Miscellaneous/Comments
T-27	12	8	3/16	Poor	Empty except for roof debris on bottom 1 to 2 inches of liquid on bottom; most likely rain water	Roof is missing (rusted away)
T-28	25.5	9	1/4	Fair	Empty except for solid debris and tank scale	Riveted steel
T-29	30	10.5	3/16	Fair	Unknown	Inaccessible port
T-30	20.3	10	1/4	Fair	Unknown	Riveted steel Inaccessible port
T-31	24.5	10.5	3/16	Poor	1 inch liquid on bottom and minimal scale	
T-32	16	8	1/4	Poor	Unknown	Inaccessible port Severely dented
T-33	27	8	3/16	Fair	Clean and dry with minimal tank scale	Painted on side "Caution PCBs"
T-34	16	13	3/16	Poor	Clean and empty with minimal scale	Miscellaneous piping along side
T-35	6.25	5	3/16	Fair	1/2 inch liquid with tank scale and crust	
T-36	19	6	3/16	Fair	Clean and dry	Built 1971

TABLE 1

TANK INVENTORY SUMMARY TABLE

Tank Number	Height/Length (Ft)	Diameter (Ft)	Thickness (In)	Condition	Contents	Miscellaneous/Comments
T-37	12	5.5	3/16	Fair	Clean and dry	8 feet of pipe along tank
T-38	12	5.5	3/16	Fair	Unknown	Inaccessible port
T-39	13	9.5	3/16	Fair	2 inch tank scale Solid debris unknown	
T-40	12	5.5	3/16	Fair	Unknown	Inaccessible port
T-41	13	9.5	3/16	Fair	Clean with minimal scale	
T-42	13	9.5	3/16	Fair	Clean and empty	
T-43	13	9.5	3/16	Fair	Clean and empty	
T-44	6	5.5	3/16	Fair	Clean and dry Minimal scale	
T-45	12.2	3.8	3/16	Fair	Unknown	Inaccessible port
T-46	6	6	3/16	Poor	Clean and dry	Wrapped in foam insulation with miscellaneous piping
T-47	6	4.5	3/16	Poor	Clean and dry with minimal tank scale	Wrapped in foam insulation with miscellaneous piping
T-48	11.5	5	1/4	Fair/Good	1/4 inch liquid; otherwise clean	Stainless steel construction with miscellaneous piping
T-49	6	4	3/16	Fair	Clean and dry	Miscellaneous piping

TABLE 1

TANK INVENTORY SUMMARY TABLE

Tank Number	Height/Length (Ft)	Diameter (Ft)	Thickness (In)	Condition	Contents	Miscellaneous/Comments
T-50	6	6	3/16	Fair	Clean and dry	Wrapped in foam insulation
T-51	6	4.5	3/16	Fair	Clean and dry	Wrapped in foam insulation
T-52	30	6	3/8	Fair	Unknown	Riveted steel Inaccessible ports
T-53	22	7.5	3/16	Fair	Unknown	Inaccessible ports

Notes

1. All tanks and piping are constructed of carbon steel unless otherwise noted.
2. All tanks had no detectable PID or LEL/O_2 indications other than background readings.
3. Considerable amount of brush exists between/around tanks including trees up to 4 inches in diameter.
4. A concrete and steel tank stand, forklift, and other various steel debris is scattered about the tank area.
5. References to measurements (height, diameter, and thickness of tank) are approximate.

TABLE 2 DRUM STORAGE AREA INVENTORY SUMMARY TABLE			
Drum Storage Area	Quantity of Drums	Condition	Comments
1	240 ±	Poor: Deteriorated	Drums from the Enviro-Chem Site, the Northside Sanitary Landfill, and the Third Site contained soil cuttings from drilling operations, groundwater, decontamination water, and chemical protective clothing. Several drums are unmarked as to their contents or source of contents. Some drums have rusted open and now contain nothing.
2	10	New: Able to be shipped as is	Eight drums contain soil cuttings, decontamination water, groundwater, and chemical protective clothing from activities on the Enviro-Chem Site generated by AWD. Two unused drums remain empty.

Notes

1. All drums are 55-gallon.
2. Approximately 20 other drums are located in various other areas onsite.

TABLE 3

STRUCTURE INVENTORY SUMMARY TABLE

Building	Dimensions (Ft)	Building Materials	Contents
A-Frame House	28 x 20 x 18 H	All wood construction with asphalt shingles; above ground construction; no foundation	
Lower Floor; West Room	12 x 18		Ten 50-lb bags of grass fertilizer Eight 50-lb bags of plant food Three gallons of pesticide Two gallons of paint One 55-gallon drum; unknown contents One tire Six milk crates One 5-foot book shelf Ten square feet of rubber matting Several florescent light fixtures (4-foot long) Three boxes of florescent light tubes (4-foot long) Several yard hand tools Other miscellaneous debris
Lower Floor; East Room	12 x 18		5 foot x 3 foot kitchen cabinet unit One kitchen sink One table band saw One wall air conditioning unit Two work tables Three chairs Two lawn fertilizer spreaders 100 feet of 1-inch PVC tubing Several boxes of sorbent pads (24 inch x 24 inch) and 8-inch diameter x 6 feet long sorbent sock One tire One 55-gallon tub Two rolls of carpet pad (6 foot x 20-inch diameter) Miscellaneous 5-gallon buckets of debris Loose fertilizer on floor

TABLE 3

STRUCTURE INVENTORY SUMMARY TABLE
PAGE 2 OF 3

Building	Dimensions (Ft)	Building Materials	Contents
Upper Level; One Room	24 x 10	9 inch x 9 inch vinyl floor tile	Three boxes of sorbent pads (24 inch x 24 inch) Miscellaneous debris (basically clean and empty)
Outside; West			One office desk One fertilizer spreader Wood debris Miscellaneous debris
Outside; East			Two air conditioner units One office desk Miscellaneous debris
Process Building	76 x 36/30 x 32 H		
Room 1	30 x 18 x 16 H	One cinder block wall (16 feet high x 30 feet) Eight 8 foot x 8 inch steel beams 150 feet of 6-inch channel steel Aluminum sheeting on walls and roof with fiberglass insulation Concrete floor/foundation	One boiler (16 foot x 6 1/2 foot diameter on 8-inch steel I-beam frame) One 5 foot x 3 foot fuel tank One 8 foot x 4 foot electrical panel
Room 2	30 x 27 x 16 H	Two cinder block walls (one between Rooms 1 and 2 accounted for in Room 1 listing (16 feet high x 30 feet) Aluminum walls on east and west sides Eight 8 inch x 30 foot steel beams Two 8 inch to 18 inch x 30 foot main beams Four 8 inch x 12 foot steel upright beams 120 feet of 6-inch steel channel beams Concrete floor/foundation	Various steel piping Three 10 foot x 8 foot book shelves (2 steel/1 wooden) One snowmobile Fifteen 4 foot x 8 foot styrofoam sheeting insulation

TABLE 3

STRUCTURE INVENTORY SUMMARY TABLE

Building	Dimensions (Ft)	Building Materials	Contents
Room 3	36 x 33 x 32 H	Two cinder block walls (between Rooms 2 and 3 accounted for in Room 2); the other wall is 23 feet high x 36 feet Aluminum walls on east and west sides Partially missing aluminum roof Wooden roof supports Concrete floor/foundation	One 6-foot exhaust fan built in ceiling Forty florescent light fixtures (4-foot long) Twelve steel bookshelves Six tires Forty 6-inch PVC elbows and tees Rolls of fiberglass insulation Various other debris

Note

1. All concrete floors/foundations will be left intact.
2. There was 2 to 6 inches of water present on the floor of Room 1 of the process building during this inventory. However, the amount of water will fluctuate based on weather conditions.
3. There is a power pole (with two transformers) located outside the northwest corner of Room 1 of the process building.

TABLE 4

MISCELLANEOUS DEBRIS AREA INVENTORY SUMMARY TABLE
(SEE DRAWINGS FOR LOCATIONS)

Miscellaneous Debris Area	Debris Item
1	Seven 55-gallon drums - unknown contents One 4 foot x 4 foot utility sink Pile of cardboard Pile of pieces of wood Painting tools
2	Ten 12-foot wood planks One 18 foot x 10 inch steel lifting beam Twelve 10 foot x 3 foot aluminum sheets
3	Scaffolding material - planks, stands, ladders One riding lawn mower One 30-gallon fuel tank Fifteen feet of 5-inch steel pipe Four 10 foot x 3 foot aluminum sheets One metal storage box (4 foot x 3 foot x 2 foot) Two rolls of chicken wire (2 1/2 foot x 18 inches) One roll of cyclone fence (4 foot x 20 inches) Two 20-foot aluminum gutters Six prefab roof supports (25 foot x 4 foot)
4	Six tires One lawn mower Four wooden planks One snowmobile carcass
5	10 foot x 10 foot x 2 inch aluminum roof panel Eight 55-gallon drums - contents unknown Wood pile 20 square feet x 4 inches high 600 feet of 1-inch PVC piping 300 feet of 6-inch PVC piping 30 feet of 8-inch PVC piping 100 feet of 2-inch galvanized steel pipe 200 feet of 4-inch corrugated flexline pipe 2-inch steel tubing/framework (100 feet total length) One air compressor Seventeen 1-foot sections of terracotta pipe 300 feet of 1-inch PVC well tubing One 30-gallon tank Twelve concrete parking blocks (6 feet long)

TABLE 4

MISCELLANEOUS DEBRIS AREA INVENTORY SUMMARY TABLE
(SEE DRAWINGS FOR LOCATIONS)

Miscellaneous Debris Area	Debris Item
6	Three 3 foot x 15 foot sheets of aluminum One 6 foot x 3 foot book shelf One 10 foot x 12 foot aluminum wall One snowmobile carcass Scattered insulation One diesel truck engine Two truck tires One aluminum box 10 foot x 8 foot x 8 foot (storage shed) 10 foot x 12 foot area of machinery parts One 55-gallon drum - contents unknown

TABLE 5 SOIL VAPOR EXTRACTION PILOT STUDY AREA INVENTORY SUMMARY TABLE		
Item	Quantity	Debris in Area
Pilot Vapor Extraction System	100 feet of 4-inch exposed PVC pipe 80 feet of 4-inch buried PVC pipe	8 railroad timbers 20 tires 30 feet of 4-inch corrugated flex line

Note

1. Buried pipe not included in this contract.

TABLE 6

OTHER SITE DEBRIS INVENTORY SUMMARY TABLE

Item	Approximate Quantity	Location
Dismantled modular tanks	450 square feet aluminum and plastic liner	Southern concrete pad
Wood pile	20 feet x 10 feet x 4 feet high	Southern concrete pad
Various pieces of aluminum sheeting	20	Entire site
Bentonite	1 pallet (500 lbs)	Northwest of Process Building

APPENDIX B

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP)

Toxicity Characteristic Leaching Procedure (TCLP)

When the sample contains no filterable liquid, the TCLP method is performed as follows:

1. Obtain a representative 100 gram sample of solid material.

2. Crush material to <9.5 mm, if necessary, and place in extraction vessel.

3. Determine appropriate extraction medium:

   a. Weigh out 5 grams subsample of sample; reduce particle size to < 1 mm, if required; place sample in a 500 mL beaker.

   b. Add 96.5 mL of distilled/deionized water (ASTM Type II).

   c. Stir sample vigorously for 5 minutes with magnetic stirrer.

   d. Measure pH, and, if pH is ≤ 5, use Extraction Fluid No. 1.

   e. If pH >5, add 3.5 mL 1.) N HCl; slurry for 30 seconds; heat to 50°C for 10 minutes.

   f. Allow mixture to cool to room temperature and measure pH.

   g. if pH ≤ 5, use Extraction Fluid No. 1. and if pH >5, use Extraction Fluid No. 2.

4. Add amount of extraction fluid selected in Step 3 equal to 20 times the weight of the solid residue.

5. Close extraction vessel, and agitate in rotary extractor device at 30 ±2 rpm for 18 hours, maintaining the temperature at 22 ±3°C.

6. Filter material through a 0.6 to 0.8 μm glass fiber filter.

7. Analyze or preserve filtrate as required.

If the residue sample contains filterable liquid, the sample is first separated into its component phases, and the above procedure is carried out on the solid phase. Then if the initial filtrate and solid extract are compatible (i.e., will not form multiple phases or precipitates on combination), they are analyzed separately, and the results are mathematically combined to yield the total leachable composition.

Since the pH of the waste determines the nature of the extraction fluid used, either Extraction Fluid No. 1 or No. 2, it is important to define the TCLP definition of these fluids:

- Extraction Fluid No. 1 is made by combining 64.3 mL of 1.0 N NaOH and 5.7 mL glacial acetic acid to the appropriate volume of water and diluting to a volume of 1 liter. The pH of this fluid should be 4.93 ±0.02.

- Extraction Fluid No. 2 is made by diluting 5.7 mL glacial acetic acid with ASTM Type 2 water to a volume of 1 liter. The pH of this fluid should be 2.88 ±0.02.

APPENDIX C

CONTAMINANT-FREE SAMPLE CONTAINERS

OSWER Directive # 9240.0-05A

SPECIFICATIONS

AND

GUIDANCE

FOR

CONTAMINANT-FREE SAMPLE CONTAINERS

APRIL 1992

TABLE OF CONTENTS

SECTION I

INTRODUCTION

In August 1989, the Environmental Protection Agency's (EPA) Office of Emergency and Remedial Response (OERR) decentralized Superfund's Sample Container Repository program (OSWER Directive #9240.0-05). In conjunction with the decentralization of Superfund's bottle program, OERR issued specifications and guidance for preparing contaminant-free sample containers to assist the Regions in obtaining appropriate sample containers from commercially available suppliers.

The April 1992 version of "Specifications and Guidance for Contaminant-Free Sample Containers" revises the specifications and provides a single source of standardized specifications and guidance on appropriate cleaning procedures for preparing contaminant-free sample containers that meet all Contract Laboratory Program (CLP) detection/quantitation limits, including those for low concentration analyses.[1] Although the specifications and guidance procedures contained in this document are based on CLP low concentration requirements, they also are suitable for use in other analytical programs.

Specifications and guidance for preparing contaminant-free sample containers are provided in the sections that follow and are intended to describe one approach for obtaining cleaned, contaminant-free sample containers for use by groups performing sample collection activities under Superfund and other hazardous waste programs. Although other cleaning procedures may be used, sample containers must meet the criteria specified in Section II. In certain instances, the user of the sample containers may require exact adherence to the cleaning procedures and/or quality control analysis described in this document. In other instances, the user may require additional or different cleaning procedures and/or quality control analysis of the sample containers. The specific needs of the bottle user will determine the requirements for the cleaning and quality control analysis of the sample containers as long as the minimum criteria are met. It is the responsibility of the bottle user to define the sample container preparation, cleaning, and quality control requirements.

The document has been extensively reviewed and revised since the August 1989 iteration, and important enhancements have been incorporated, including:

- Removing references to the color of the closures;
- Allowing the use of polypropylene closures as an alternative to

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[1] Because this document does not address the procurement of contaminant-free sample containers, the title was changed from "Specifications and Guidance for Obtaining Contaminant-Free Sample Containers" to "Specifications and Guidance for Contaminant-Free Sample Containers."

phenolic closures;

- Referencing CLP Low Concentration Organics and Inorganics Statements of Work for the analysis of calibration verification solutions and blanks;

- Including cleaning and quality control procedures for fluoride and nitrate/nitrite;

- Removing the hexane rinse from the cleaning procedure for container types A, E, F, G, H, J, and K (semivolatile organics, pesticides, metals, cyanide, and fluoride in soils and water);

- Adding the recommendation that the bottle vendor establish and submit a Quality Assurance Plan (QAP);

- Changing the QA/QC documentation requirements so that copies of the raw data from the analyses of the QC containers are available upon request and not automatically sent to the bottle purchaser;

- Changing the permanent lot number assignment to a nine digit number from an eight digit number, where the extra digit represents the analysis parameter;

- Adding Chemical Abstract Services (CAS) registry number for the inorganic analytes in Table 1; and

- Recommending an annual demonstration of the bottle vendor's ability to meet detection limits and establish reproducibility of the cleaning techniques.

OERR and the EPA Regions decided to use the most stringent CLP requirements available to set the specifications for obtaining contaminant-free sample containers. As a result, the CLP Inorganics and Organics Low Concentration Statement of Work (SOW) requirements were selected as the basis for these specifications. Major factors in this decision included the desire to have a set of bottle cleaning specifications that met or exceeded all analytical requirements and the related need to avoid potential misuse of cleaned bottles (e.g., using a container cleaned by a multi-concentration procedure for a low concentration sample). OERR will reevaluate this decision if the low concentration requirements are deemed to be too stringent.

Most environmental sampling and analytical applications offer numerous opportunities for sample contamination. For this reason, contamination is a common source of error in environmental measurements. The sample container itself represents one such source of sample contamination. Hence, it is vital that sample containers used within the Superfund program meet strict specifications established to minimize contamination which could affect subsequent analytical determinations. Superfund sampling and analysis activities require all component materials (caps, liners, septa, packaging materials, etc.) provided by the bottle preparer to meet the criteria limits of the bottle specifications listed within Section II.

Section III provides guidance on cleaning procedures for preparing contaminant-free sample containers that meet the specifications contained in Section II. The procedures provided in this section are intended to provide sample containers that meet all current CLP Low Concentration Inorganics and Organics detection/quantitation levels.

In selecting cleaning procedures for sample containers, it is important to consider all of the parameters of interest. Although a given cleaning procedure may be effective for one parameter or type of analysis, it may be ineffective for another. When multiple determinations are performed on a single sample or on a subsample from a single container, a cleaning procedure may actually be a source of contamination for some analytes while minimizing contamination in others. It should be the responsibility of the bottle supplier to verify that the cleaning procedures actually used satisfy the quality control requirements set forth in Section IV.

Two aspects of quality assurance (i.e., quality control and quality assessment) must be applied to sample containers as well as to the analytical measurements. Quality control includes the application of good laboratory practices and standard operating procedures especially designed for the cleaning of sample containers. The cleaning operation should be based on protocols especially designed for specific contaminant problems. Strict adherence to these cleaning protocols is imperative. Quality assessment of the cleaning process depends largely on monitoring for adherence to the respective protocols. Because of their critical role in the quality assessment of the cleaning operation, protocols must be carefully designed and followed. Guidance is provided in Section IV on design and implementation of quality assurance and quality control protocols.

SECTION II

SAMPLE CONTAINER AND COMPONENT MATERIAL SPECIFICATIONS

This Section identifies sample containers commonly used in the Superfund program and provides specifications for contaminant-free sample containers for each bottle type.

A. CONTAINER MATERIAL

A variety of factors affect the choice of containers and cap material. These include resistance to breakage, size, weight, interferences with analytes of interest, cost, and availability.

Container types A through L (Figure 1, pages 7-8) are designated as the type of sample containers that have been used successfully in the past. Kimax or Pyrex brand borosilicate glass is inert to most materials and is recommended where glass containers are used (i.e., pesticides and other organics). Conventional polyethylene is recommended when plastic is acceptable because of its lower cost and lower adsorption of metal ions. The specific sampling situation will determine the use of plastic or glass.

While the sample containers shown in Figure 1 are utilized primarily for Superfund sampling activities, they also may be used for sampling activities under other programs, such as the Resource Conservation and Recovery Act (RCRA).

B. MAXIMUM CONTAMINANT LEVEL SPECIFICATIONS FOR SAMPLE CONTAINERS

The CLP, through a series of technical caucuses, has established inorganic Contract Required Detection Limits (CRDL) and organic Contract Required Quantitation Limits (CRQL) which represent the minimum quantities needed to support the hazardous substance identification and monitoring requirements necessary for remedial and other actions at hazardous waste sites.

For inorganic sample containers, the CRDLs listed in Table 1, page 9, are the specifications for maximum trace metal contamination. Concentration at or above these limits on any parameter should preclude these containers from use in collecting inorganic samples.

The CRQL specifications for organic sample containers are listed in Table 2, pages 10-14. When the CRQL in Table 2 is multiplied by the appropriate factor listed below, the resulting value then represents the maximum concentration allowed for particular sample containers based on organic CLP sample sizes for routine analyses.

Container type	Multiple of CRQL
A	1.0
B	0.5
D	10.0
E	8.0
F	4.0
G	2.0
H	0.5
J	0.5
K	2.0

The philosophy used for determining the maximum permissible amount of contamination in a sample container was to consider the number of aliquots of sample that are available in the container and assume that the contamination present would be uniformly distributed in all of the aliquots. This assumption, and the assumption that there should be no more than one-half the CRQL contributed by the container, resulted in the establishment of contamination limits by container type. For example, the volume of container type D is sufficient to allow 20 volatile determinations. Therefore, if 10 times the CRQL of contaminant is present in the cleaned bottle, each aliquot tested will contain one-half of the CRQL of contaminant due to the contribution from the bottle.

C. GROSS CONTAMINATION

Gross contamination is defined as greater than two hundred times the acceptable concentration values in Tables 1 or 2 (multiplied by the appropriate factor), unless the cleaning procedure is successful in reducing the amount of contamination to within specifications. If this is not achieved, the grossly contaminated materials should be discarded and replaced to prevent cross contamination with other batches of containers. The bottle preparer should inspect all materials to ensure conformance with the required specifications.

FIGURE 1

SAMPLE CONTAINER
SPECIFICATIONS

Container Type	Specifications
A	Container: 80-oz amber glass, ring handle bottle/jug, 38-mm neck finish. Closure: polypropylene or phenolic cap, 38-430 size; 0.015-in Teflon liner. Total Weight: 2.45 lbs.
B	Container: 40-mL glass vial, 24-mm neck finish. Closure: polypropylene or phenolic, open-top, screw cap, 15-cm opening, 24-400 size. Septum: 24-mm disc of 0.005-in Teflon bonded to 0.120-in silicon for total thickness of 0.125-in. Total Weight: 0.72 oz.
C	Container: 1-L high-density polyethylene, cylinder-round bottle, 28-mm neck finish. Closure: polyethylene cap, ribbed, 28-410 size; F217 polyethylene liner. Total Weight: 1.89 oz.
D	Container: 120-mL wide mouth, glass vial, 48-mm neck finish. Closure: polypropylene cap, 48-400 size; 0.015-in Teflon liner. Total Weight: 4.41 oz.
E	Container: 16-oz tall, wide mouth, straight-sided, flint glass jar, 63-mm neck finish. Closure: polypropylene or phenolic cap, 63-400 size; 0.015-in Teflon liner. Total Weight: 9.95 oz.
F	Container: 8-oz short, wide mouth, straight-sided, flint glass jar, 70-mm neck finish. Closure: polypropylene or phenolic cap, 70-400 size; 0.015-in Teflon liner. Total Weight: 7.55 oz.

FIGURE 1

SAMPLE CONTAINER
SPECIFICATIONS
(Continued)

Container Type	Specifications
G	Container: 4-oz tall, wide mouth, straight-sided, flint glass jar, 48-mm neck finish. Closure: polypropylene or phenolic cap, 48-400 size; 0.015-in Teflon liner. Total Weight: 4.70 oz.
H	Container: 1-L amber, Boston round, glass bottle, 33-mm pour-out neck finish. Closure: polypropylene or phenolic cap, 33-430 size; 0.015-in Teflon liner. Total Weight: 1.11 lbs.
J	Container: 32-oz tall, wide mouth, straight-sided, flint glass jar, 89-mm neck finish. Closure: polypropylene or phenolic cap, 89-400 size; 0.015-in Teflon liner. Total Weight: 1.06 lbs.
K	Container: 4-L amber glass, ring handle bottle/jug, 38-mm neck finish. Closure: polypropylene or phenolic cap, 38-430 size; 0.015-in Teflon liner. Total Weight: 2.88 lbs.
L	Container: 500-mL high-density polyethylene, cylinder-round bottle, 28-mm neck finish. Closure: polypropylene cap, ribbed, 28-410 size; F217 polyethylene liner. Total Weight: 1.20 oz.

TABLE 1

INORGANIC ANALYTE
SPECIFICATIONS

	Analyte	CAS Number	Contract Required Detection Limits[1] (µg/L)
1.	Aluminum	7429-90-5	100
2.	Antimony	7440-36-0	5
3.	Arsenic	7440-38-2	2
4.	Barium	7440-39-3	20
5.	Beryllium	7440-41-7	1
6.	Cadmium	7440-43-9	1
7.	Calcium	7440-70-2	500
8.	Chromium	7440-47-3	10
9.	Cobalt	7440-48-4	10
10.	Copper	7440-50-8	10
11.	Iron	7439-89-6	500
12.	Lead	7439-92-1	2
13.	Magnesium	7439-95-4	500
14.	Manganese	7439-96-5	10
15.	Mercury	7439-97-6	0.2
16.	Nickel	7440-02-0	20
17.	Potassium	7440-09-7	750
18.	Selenium	7782-49-2	3
19.	Silver	7440-22-4	10
20.	Sodium	7440-23-5	500
21.	Thallium	7440-28-0	10
22.	Vanadium	7440-62-2	10
23.	Zinc	7440-66-6	20
24.	Cyanide	57-12-5	10
25.	Fluoride	16984-48-8	200
26.	Nitrate/Nitrite	1-00-5	100

[1]CRDLs are based on the CLP Inorganics Low Concentration SOW

TABLE 2

ORGANIC COMPOUND
SPECIFICATIONS

	Volatiles	CAS Number	Contract Required Quantitation Limits[1] (µg/L)
1.	Chloromethane	74-87-3	1
2.	Bromomethane	74-83-9	1
3.	Vinyl Chloride	75-01-4	1
4.	Chloroethane	75-00-3	1
5.	Methylene Chloride	75-09-2	2
6.	Acetone	67-64-1	5
7.	Carbon Disulfide	75-15-0	1
8.	1,1-Dichloroethene	75-35-4	1
9.	1,1-Dichloroethane	75-34-3	1
10.	cis-1,2-Dichloroethene	156-59-4	1
11.	trans-1,2-Dichloroethene	156-60-5	1
12.	Chloroform	67-66-3	1
13.	1,2-Dichloroethane	107-06-2	1
14.	2-Butanone	78-93-3	5
15.	Bromochloromethane	74-97-5	1
16.	1,1,1-Trichloroethane	71-55-6	1
17.	Carbon Tetrachloride	56-23-5	1
18.	Bromodichloromethane	75-27-4	1
19.	1,2-Dichloropropane	78-87-5	1
20.	cis-1,3-Dichloropropene	10061-01-5	1
21.	Trichloroethene	79-01-6	1
22.	Dibromochloromethane	124-48-1	1
23.	1,1,2-Trichloroethane	79-00-5	1
24.	Benzene	71-43-2	1
25.	trans-1,3-Dichloropropene	10061-02-6	1
26.	Bromoform	75-25-2	1
27.	4-Methyl-2-pentanone	108-10-1	5
28.	2-Hexanone	591-78-6	5
29.	Tetrachloroethene	127-18-4	1
30.	1,1,2,2-Tetrachloroethane	79-34-5	1

[1]CRQLs are based on the CLP Organics Low Concentration SOW

TABLE 2

ORGANIC COMPOUND SPECIFICATIONS (Continued)

	Volatiles	CAS Number	Contract Required Quantitation Limits[1] (µg/L)
31.	1,2-Dibromoethane	106-93-4	1
32.	Toluene	108-88-3	1
33.	Chlorobenzene	108-90-7	1
34.	Ethylbenzene	100-41-4	1
35.	Styrene	100-42-5	1
36.	Xylenes (total)	1330-20-7	1
37.	1,3-Dichlorobenzene	541-73-1	1
38.	1,4-Dichlorobenzene	106-46-7	1
39.	1,2-Dichlorobenzene	95-50-1	1
40.	1,2-Dibromo-3-chloropropane	96-12-8	1

[1]CRQLs are based on the CLP Organics Low Concentration SOW

TABLE 2

ORGANIC COMPOUND
SPECIFICATIONS
(Continued)

	Semivolatiles	CAS Number	Contract Required Quantitation Limits[1] (µg/L)
1.	Phenol	108-95-2	5
2.	bis-(2-Chlorethyl)ether	111-44-4	5
3.	2-Chlorophenol	95-57-8	5
4.	2-Methylphenol	95-48-7	5
5.	2,2'-oxybis-(1-Chloropropane)	108-60-1	5
6.	4-Methylphenol	106-44-5	5
7.	N-Nitroso-di-n-dipropylamine	621-64-7	5
8.	Hexachloroethane	67-72-1	5
9.	Nitrobenzene	98-95-3	5
10.	Isophorone	78-59-1	5
11.	2-Nitrophenol	88-75-5	5
12.	2,4-Dimethylphenol	105-67-9	5
13.	bis-(2-Chloroethoxy)methane	111-91-1	5
14.	2,4-Dichlorophenol	120-83-2	5
15.	1,2,4-Trichlorobenzene	120-82-1	5
16.	Naphthalene	91-20-3	5
17.	4-Chloroaniline	106-47-8	5
18	Hexachlorobutadiene	87-68-3	5
19.	4-Chloro-3-methylphenol	59-50-7	5
20.	2-Methylnaphthalene	91-57-6	5
21.	Hexachlorocyclopentadiene	77-47-4	5
22.	2,4,6-Trichlorophenol	88-06-2	5
23.	2,4,5-Trichlorophenol	95-95-4	20
24.	2-Chloronaphthalene	91-58-7	5
25.	2-Nitroaniline	88-74-4	20
26.	Dimethylphthalate	131-11-3	5
27.	Acenaphthylene	208-96-8	5
28.	2,6-Dinitrotoluene	606-20-2	5
29.	3-Nitroaniline	99-09-2	20
30.	Acenaphthene	83-32-9	5

[1]CRQLs are based on the CLP Organics Low Concentration SOW

TABLE 2

ORGANIC COMPOUND
SPECIFICATIONS
(Continued)

	Semivolatiles	CAS Number	Contract Required Quantitation Limits[1] (µg/L)
31.	2,4-Dinitrophenol	51-28-5	20
32.	4-Nitrophenol	100-02-7	20
33.	Dibenzofuran	132-64-9	5
34.	2,4-Dinitrotoluene	121-14-2	5
35.	Diethylphthalate	84-66-2	5
36.	4-Chlorophenyl-phenylether	7005-72-3	5
37.	Fluorene	86-73-7	5
38.	4-Nitroaniline	100-01-6	20
39.	4,6-Dinitro-2-methylphenol	534-52-1	20
40.	N-Nitrosodiphenylamine	86-30-6	5
41.	4-Bromophenyl-phenylether	101-55-3	5
42.	Hexachlorobenzene	118-74-1	5
43.	Pentachlorophenol	87-86-5	20
44.	Phenanthrene	85-01-8	5
45.	Anthracene	120-12-7	5
46.	Di-n-butylphthalate	84-74-2	5
47.	Fluoranthene	206-44-0	5
48	Pyrene	129-00-0	5
49.	Butylbenzylphthalate	85-68-7	5
50.	3,3'-Dichlorobenzidine	91-94-1	5
51.	Benz(a)anthracene	56-55-3	5
52.	Chyrsene	218-01-9	5
53.	bis-(2-Ethylhexyl)phthalate	117-81-7	5
54.	Di-n-octylphthalate	117-84-0	5
55.	Benzo(b)fluoranthene	205-99-2	5
56.	Benzo(k)fluoranthene	207-08-9	5
57.	Benzo(a)pyrene	50-32-8	5
58.	Indeno(1,2,3-cd)pyrene	193-39-5	5
59.	Dibenz(a,h)anthracene	53-70-3	5
60.	Benzo(g,h,i)perylene	191-24-2	5

[1]CRQLs are based on the CLP Organics Low Concentration SOW

TABLE 2

ORGANIC COMPOUND
SPECIFICATIONS
(Conti· :ed)

	Pesticides/PCBs	CAS Number	Contract Required Quantitation Limits[1] (µg/L)
1.	alpha-BHC	319-84-6	0.01
2.	beta-BHC	319-85-7	0.01
3.	delta-BHC	319-86-8	0.01
4.	gamma-BHC (Lindane)	58-89-9	0.01
5.	Heptachlor	76-44-8	0.01
6.	Aldrin	309-00-2	0.01
7.	Heptachlor epoxide	1024-57-3	0.01
8.	Endosulfan I	959-98-8	0.01
9.	Dieldrin	60-57-1	0.02
10.	4,4'-DDE	72-55-9	0.02
11.	Endrin	72-20-8	0.02
12.	Endosulfan II	33213-65-9	0.02
13.	4,4'-DDD	72-54-8	0.02
14.	Endosulfan sulfate	1031-07-8	0.02
15.	4,4'-DDT	50-29-3	0.02
16.	Methoxychlor	72-43-5	0.10
17.	Endrin ketone	53494-70-5	0.02
18	Endrin aldehyde	7421-36-3	0.02
19.	alpha-Chlordane	5103-71-9	0.01
20.	gamma-Chlordane	5103-74-2	0.01
21.	Toxaphene	8001-35-2	1.0
22.	Aroclor-1016	12674-11-2	0.20
23.	Aroclor-1221	11104-28-2	0.20
24.	Aroclor-1232	11141-16-5	0.40
25.	Aroclor-1242	53469-21-9	0.20
26.	Aroclor-1248	12672-29-6	0.20
27.	Aroclor-1254	11097-69-1	0.20
28.	Aroclor-1260	11096-82-5	0.20

[1]CRQLs are based on the CLP Organics Low Concentration SOW

SECTION III

SAMPLE CONTAINER PREPARATION AND CLEANING PROCEDURES

This Section is provided as guidance for the preparation of sample containers that meet the contaminant-free specifications contained in Section II. There are various procedures for cleaning sample containers depending upon the analyses to be performed on the sample. The following cleaning procedures are modeled after those specified for the Superfund Sample Container Repository program. Other suitable cleaning procedures exist and may be used as long as the sample containers meet the criteria established in Section II. In some instances, the specific needs of the bottle user may dictate exact adherence to the sample container preparation and cleaning procedures that follow; while in other instances, modifications may be required. It is the responsibility of the bottle user to define the sample container preparation, cleaning, and quality control requirements.

A. Cleaning Procedure for Container Types: A, E, F, G, H, J, and K

1. Sample Type: Semivolatile Organics, Pesticides, Metals, Cyanide, and Fluoride in Soils and Water.

   a. Wash glass bottles, Teflon liners, and caps with hot tap water using laboratory grade nonphosphate detergent.

   b. Rinse three times with copious amounts of tap water to remove detergent.

   c. Rinse with 1:1 nitric acid (reagent grade HNO_3, diluted with ASTM Type I deionized water).

   d. Rinse three times with ASTM Type I organic free water.

   e. Oven dry bottles, liners, and caps at 105-125°C for one hour.

   f. Allow bottles, liners, and caps to cool to room temperature in an enclosed contaminant-free environment.

   g. Rinse bottles with pesticide grade methylene chloride (or other suitable solvents specified by the bottle user) using 20 mL for ½-gallon containers; 10 mL for 32-oz and 16-oz containers; and 5 mL for 8-oz and 4-oz containers.

   h. Oven dry bottles, liners, and caps at 105-125°C for one hour.

   i. Allow bottles, liners, and caps to cool to room temperature in an enclosed contaminant-free environment.

   j. Place liners in lids and cap containers.

k. Label each container with the lot number and pack in a case.

l. Label exterior of each case with the lot number.

m. Store in a contaminant-free area.

2. Sample Type: Nitrate/Nitrite in Soils and Water.

a. Substitute reagent grade sulfuric acid (H_2SO_4) for nitric acid in step A.1.c.

b. Follow all other steps in the cleaning procedure described in part A.1 above.

B. Cleaning Procedure for Container Types: B, D

1. Sample Type: Purgeable (Volatile) Organics in Soils and Water.

a. Wash glass vials, Teflon-backed septa, Teflon liners, and caps in hot water using laboratory grade nonphosphate detergent.

b. Rinse three times with copious amounts of tap water to remove detergent.

c. Rinse three times with ASTM Type I organic-free water.

d. Oven dry vials, caps, septa, and liners at 105-125°C for one hour.

e. Allow vials, caps, septa, and liners to cool to room temperature in an enclosed contaminant-free environment.

f. Seal 40-mL vials with septa (Teflon side down) and cap.

g. Place liners in lids and cap 120-mL vials.

h. Label each vial with the lot number and pack in a case.

i. Label exterior of each case with the lot number.

j. Store in a contaminant-free area.

C. Cleaning Procedure for Container Types: C, L

1. Sample Type: Metals, Cyanide, and Fluoride in Soils and Water.

a. Wash polyethylene bottles and caps in hot tap water using laboratory-grade nonphosphate detergent.

b. Rinse three times with copious amounts of tap water to remove detergent.

c. Rinse with 1:1 nitric acid (reagent grade HNO_3, diluted with ASTM Type I deionized water).

d. Rinse three times with ASTM Type I deionized water.

e. Invert and air dry in a contaminant-free environment.

f. Cap bottles.

g. Label each container with the lot number and pack in a case.

h. Label exterior of each case with the lot number.

i. Store in a contaminant-free area.

2. **Sample Type:** Nitrate/Nitrite in Soils and Water.

a. Substitute reagent grade sulfuric acid (H_2SO_4) for nitric acid in step C.1.c.

b. Follow all other steps in the cleaning procedure described in part C.1 above.

SECTION IV

SAMPLE CONTAINER QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

A. Quality Assurance

The objectives of this Section are to: (1) present procedures for evaluating quality assurance (QA) information to ensure that specifications identified in Section II have been met; and (2) discuss techniques for the quality control (QC) analysis of sample containers to be used in conjunction with the cleaning procedures contained in Section III.

The bottle vendor should establish a Quality Assurance Plan (QAP) with the objective of providing sound analytical chemical measurements, production procedures, and tracking systems. The QAP should incorporate procedures for the inspection of incoming raw materials; preparation, cleaning, and labeling of container lots; quality control analyses of cleaned container lots; document control, including all documentation required for analysis, packing, shipping, and tracking of container lots; any necessary corrective actions; and any quality assessment measures implemented by management to ensure acceptable performance. The QAP should be available and provided to the bottle purchaser upon request.

Major QA/QC activities should include the inspection of all incoming materials, QC analysis of cleaned lots of containers, and monitoring of the container storage area. Complete documentation of all QC inspection results (acknowledging acceptance or rejection) should be kept as part of the permanent bottle preparation files. QA/QC records (e.g., preparation/QC logs, analytical data, data tapes, storage log) also should be stored in a central location within the facility.

Documentation indicating that the container lot has passed all QA/QC requirements should be provided by the bottle vendor to the bottle purchaser with each container lot. Documentation should include a signed and dated cover statement affirming that all QA/QC criteria were met. Copies of raw data from applicable analyses of the QC containers, laboratory standards, check samples, and blanks should be available and provided upon request. Original documentation should be retained for at least 10 years. Minimum documentation that should be available, if applicable, for each lot of containers includes:

- A statement that "Sample container lot _______ meets or exceeds all QA/QC criteria established in 'Specifications and Guidance for Contaminant-Free Sample Containers;'"
- Reconstructed Ion Chromatographs (RICs) from volatile and semivolatile organics determinations, including calibration verification standards, check samples, and blanks;
- GC chromatographs from pesticides determinations, including calibration verification standards, check samples, and blanks;

- ICP, hydride-ICP, or ICP-MS instrument readouts from metals determinations, including calibration verification standards, check samples, and blanks;

- AA raw data sheets and instrument readouts from metals determinations, including calibration verification standards, check samples, and blanks; and

- Cyanide, fluoride, and nitrate/nitrite raw data sheets and instrument readouts from these determinations, including calibration verification standards, check samples, and blanks.

Prior to the first shipment of containers, and at least annually thereafter, the bottle vendor should demonstrate its ability to meet the CRDLs and CRQLs, and establish the reproducibility of the cleaning techniques for each bottle type. The ability to meet the CRDLs and CRQLs is accomplished through the determination of instrument detection limits (IDLs). The bottle vendor should use the procedures in the current CLP Low Concentration Inorganics and Organics SOWs to determine IDLs. IDLs should be below the CRDLs or CRQLs. To establish the reproducibility for each bottle type, the bottle vendor should randomly pick seven containers from a cleaned lot and analyze as described in the Quality Control Analysis part of this Section. Parameter concentrations should be at or below the CRDL or CRQL for each bottle type. Documentation from these analyses should be available and provided upon request.

1. Incoming Materials Inspection:

A representative item from each case of containers should be checked for conformance with specifications provided in Section II. Any deviation should be considered unacceptable. A log of incoming shipments should be maintained to identify material type, purchase order number, and delivery date. The date of incoming inspection and acceptance or rejection of the material should also be recorded on this log.

2. Quality Control Inspection of Cleaned Lots of Containers:

Following container cleaning and labeling, containers should be randomly selected from each container lot to be used for QC purposes. The two categories of QC containers should be as follows:

a. Analysis QC Containers:

One percent of the total number of containers in each lot should be designated as the analysis QC container(s). For lots of less than 100 containers, one container should be designated as the analysis QC container. The sample container preparer should analyze the analysis QC container(s) to check for contamination prior to releasing the associated container lot for shipment. The QC analyses procedures specified in the Quality Control Analysis part of this Section for determining the presence of semivolatile and volatile organics, pesticides, metals, cyanide, fluoride, and nitrate/nitrite should be utilized.

For each analysis QC container(s), an appropriate QC number should be assigned that cross-references the QC container to the related lot of containers. For example, the QC number could be a seven-digit number sequentially assigned to each lot that has undergone QC analysis. Under this numbering scheme, the first alphabetical character would be the container type letter from Figure 1, the next four digits would be assigned sequentially in numerical order starting with "0001" for the first lot to undergo QC analyses, the sixth character would indicate the number of QC container for the lot, (e.g., "1' for the first QC container in the lot, "2" for the second, etc.) and the last character would be either a "C" to indicate clearance or an "R" to indicate rejection.

If the representative analysis QC container(s) passes QC inspection, the related lot of containers should be released, and the appropriate QC number should be entered in the preparation/QC log to indicate clearance of the lot for shipment.

If the analysis QC container(s) are found to be contaminated per the specified QC analysis procedures, the appropriate QC rejection number should be assigned and entered in the preparation/QC log. Any container labels should be removed and the entire lot returned for reprocessing under a new lot number. Excessive QC rejection for a particular container type should be noted for future reference.

A laboratory standard, check sample, and a blank should be run with each QC analysis. A calibration verification standard should be analyzed once every 12 hours. All QC analysis results should be kept in chronological order by QC report number in a central QC file. The QC numbers assigned should be documented in the preparation/QC log, indicating acceptance or rejection and date of analysis.

A container lot should not be released for shipment prior to QC analysis and clearance. Once the containers have passed QC inspection, the containers should be stored in a contaminant-free area until packaging and shipment.

b. Storage QC Containers:

One QC container per lot should be designated as the storage QC container. The storage QC container should be separated from the lot after cleaning and labeling and should be stored in a designated contaminant-free area for one year. The date the container is placed in the storage area should be recorded in the storage QC container log.

If contamination of the particular container lot comes into question at any time following shipment, the storage QC container should be removed from the storage area and analyzed using the QC analysis procedures for that container type (see Quality Control Analysis, this Section). Upon removal, containers should be logged out of the storage area.

The designated storage area should be monitored continuously for volatile contaminants in the following manner. A precleaned, 40-mL vial that has passed a QC inspection should be filled with ASTM Type I organic-free water and be placed in the storage area. This vial should be changed at one-week intervals. The removed vial should be subjected to analysis for volatile organics as described in the Quality Control Analysis part of this Section. Any peaks indicate contamination. Identify contaminants, if present, and include the results in a report to all clients who purchased bottles from the affected lot(s).

B. Quality Control Analysis

The types of QC analyses correlate with the types of containers being analyzed and their future use in sample collection. The QC analyses are intended for the determination of:

- Semivolatile organics and pesticides;
- Volatile organics;
- Metals;
- Cyanide;
- Fluoride; and
- Nitrate/Nitrite.

QC analyses should be performed according to the container type and related sample type and utilize the specific method(s) described below.

1. Determination of Semivolatile Organics and Pesticides:

Container Types: A, E, F, G, H, J, and K

a. Sample Preparation:

- Add 60 mL of pesticide-grade methylene chloride to the container and shake for two minutes.
- Transfer the solvent to a Kuderna-Danish (KD) apparatus equipped with a three-ball Snyder column. Concentrate to less than 10 mL on a steam bath. Split the solvent into two 5 mL fractions for semivolatile and pesticide determinations.
- Add 50 mL of pesticide-grade hexane (for pesticide determinations only) to the KD apparatus by slowly pouring down through the Snyder column. Concentrate to less than 10 mL to effect solvent replacement of hexane for methylene chloride.
- Concentrate the solvent to 1 mL using a micro-Snyder column.
- Prepare a solvent blank by adding 60 mL of the rinse solvent used in step "g" of the cleaning procedure for container types A, E,

F, G, H, J, and K (Section III page 15) directly to a KD apparatus, and proceed as above.

b. Semivolatile Organics Sample Analysis:

- Instrument calibration should be performed as described in the most recent CLP Low Concentration Organics SOW with the following exceptions:

  (1) If problems are encountered meeting the %RSD criteria on the initial calibration for semivolatiles, the high concentration point should be deleted and a four-point calibration used.

  (2) The low concentration standard should be used for the continuing calibration standard for semivolatile analyses.

  (3) The percent difference window should be widened to ± 30 percent for all compounds.

- Inject 1 μL of solvent into a gas chromatograph/mass spectrometer (GC/MS).

- Calibration verification standards should be analyzed as described in the most recent CLP Low Concentration Organics SOW.

- Blanks should be run as described in the most recent CLP Low Concentration Organics SOW.

- If peaks are found in the container blank that are not in the solvent blank, or if the container blank peak heights or areas are greater than 50 percent of the solvent blank peak heights or areas, the containers should be rejected.

- Identify and quantitate any contaminant(s) that cause rejection of a container lot.

- A standard mixture of the nine semivolatile organic compounds listed in Table 3 (page 29) with concentrations in the 5-20 ppb range should be analyzed to ensure that sensitivities are achieved that will meet contract required quantitation limits. This standard should be prepared from a different source from the calibration standards.

c. Pesticides Sample Analysis:

- Instrument calibration should be performed as described in the most recent CLP Low Concentration Organics SOW.

- Inject 1 μL of solvent into a gas chromatograph (GC) equipped with an electron capture detector (ECD).

- Calibration verification standards should be analyzed as described in the most recent CLP Low Concentration Organics SOW.

- Blanks should be run as described in the most recent CLP Low Concentration Organics SOW.

- If peaks are found in the container blank that are not in the solvent blank, or if the container blank peak heights or areas are greater than 50 percent of the solvent blank peak heights or areas, the containers should be rejected.

- Identify and quantitate any contaminant(s) that cause rejection of a container lot.

- A standard mixture of the seven pesticide compounds listed in Table 3 (page 29) with concentrations in the 0.01 to 1 ppb range should be analyzed to ensure that sensitivities are achieved that will meet contract required quantitation limits. This standard should be prepared from a different source from the calibration standards.

2. Determination of Volatile Organics:

Container Types: B and D

a. Sample Preparation:

- Fill the container with ASTM Type I organic-free water.

- Cap the container and let stand for 48 hours.

b. Sample Analysis:

- Instrument calibration should be performed as described in the most recent CLP Low Concentration Organics SOW with the following exceptions:

  (1) If problems are encountered meeting the %RSD criteria on the initial calibration for volatiles, the high concentration point should be deleted and a four-point calibration used.

  (2) The low concentration standard should be used for the continuing calibration standard for volatile analyses.

  (3) The percent difference window should be widened to ± 30 percent.

- Calibration verification standards should be analyzed as described in the most recent CLP Low Concentration Organics SOW.

- Blanks should be run as described in the most recent CLP Low Concentration Organics SOW. The blank should consist of an aliquot of the ASTM Type I water used in the sample preparation.

- If peaks are found in the container blank that are not in the solvent blank, or if the container blank peak heights or areas are greater than 50 percent of the solvent blank peak heights or areas, the containers should be rejected.

- Identify and quantitate any contaminant(s) that cause rejection of a container lot.

- A standard mixture of the five volatile organic compounds listed in Table 3 (page 29) with concentrations in the 1-5 ppb range should be analyzed to ensure that sensitivities are achieved that will meet contract required quantitation limits. This standard should be prepared from a different source from the calibration standards.

3. Determination of Metals:

Container Types: A, C, E, F, G, H, J, K and L

a. Sample Preparation:

- Add 100 mL of ASTM Type I deionized water to the container, and acidify with 1.0 mL of reagent-grade HNO_3. Cap and shake for three to five minutes.

- Cap the container and let stand for 48 hours.

- Treat the sample as a dissolved metals sample. Analyze the undigested water using the most recent CLP Low Concentration Inorganics SOW.

b. Sample Analysis:

- Instruments used for the analysis of the samples should meet the contract required detection limits in Table 1.

- The ASTM Type I deionized water should be analyzed before use on the bottles that are designated for analysis to ensure that contaminated water is not used for rinsing the bottles.

- Calibration verification standards should be analyzed as described in the most recent CLP Low Concentration Inorganics SOW.

- Blanks should be analyzed as described in the most recent CLP Low Concentration Inorganics SOW. A calibration blank is a solution made up exactly like the sample preparation solution. The calibration blank should be less than the values contained in Table 1.

- A set of standards in the expected working range should be analyzed with each analytical run. The acid matrix of the standards, blank, and quality control samples should match that of the samples.

- Concentrations at or above the detection limit for each parameter (listed in Table 1) should be cause for rejection of the lot of containers. **NOTE:** The sodium detection limit for container types A, E, F, G, H, J, and K is 5000 µg/L unless the containers will be used for low concentration analyses, then the detection limit is 500 µg/L.

4. Determination of Cyanide:

Container Types: A, C, E, F, G, H, J, K and L

a. Sample Preparation:

- Place 250 mL of ASTM Type I deionized water in the container. Add 1.25 mL of 6N NaOH (for container types F and G use 100 mL of ASTM Type I deionized water and 0.5 mL of 6N NaOH). Cap the container and shake vigorously for two minutes.

b. Sample Analysis:

- Analyze an aliquot as described in the most recent CLP Low Concentration Inorganics SOW.

- The detection limit should be 10 µg/L or lower.

- Calibration verification standards should be analyzed as described in the most recent CLP Low Concentration Inorganics SOW.

- Blanks should be run as described in the most recent CLP Low Concentration Inorganics SOW. The calibration blank should consist of an aliquot of the ASTM Type I water used above.

- A set of standards in the expected working range, a check sample, and blank should be prepared exactly as the sample was prepared.

- The detection of 10 µg/L cyanide (or greater) should be cause for rejection of the lot of containers. **NOTE:** Contamination could be due to the container, the cap, or the NaOH.

5. Determination of Fluoride:

Container Types: A, C, E, E, G, H, J, K and L

a. Sample Preparation:

- Place 250 mL of ASTM Type I deionized water in the container (for container types F and G use 100 mL of ASTM Type I deionized water). Cap the container and shake vigorously for two minutes.

b. Sample Analysis:

- Analyze an aliquot as described in the most recent CLP Low Concentration Inorganics SOW.

- The detection limit should be 200 $\mu g/L$ or lower.

- Calibration verification standards should be analyzed as described in the most recent CLP Low Concentration Inorganics SOW.

- Blanks should be run as described in the most recent CLP Low Concentration Inorganics SOW. The calibration blank should consist of an aliquot of the ASTM Type I water used above.

- A set of standards in the expected working range, a check sample, and blank should be prepared exactly as the sample was prepared.

- The detection of 200 $\mu g/L$ (or greater) of fluoride should be cause for rejection of the lot of containers. **NOTE:** Contamination could be due to the container or the cap.

6. Determination of Nitrate/Nitrite:

Container Types: A, C, E, F, G, H, J, K and L

a. **Sample Preparation:**

- Place 250 mL of ASTM Type I deionized water in the container (for container types F and G use 100 mL of ASTM Type I deionized water). Cap the container and shake vigorously for two minutes.

b. **Sample Analysis:**

- Analyze an aliquot as described in the most recent CLP Low Concentration Inorganics SOW.

- The detection limit should be 100 $\mu g/L$ or lower.

- Calibration verification standards should be analyzed as described in the most recent CLP Low Concentration Inorganics SOW.

- Blanks should be run as described in the most recent CLP Low Concentration Inorganics SOW. The calibration blank should consist of an aliquot of the ASTM Type I water used above.

- A set of standards in the expected working range, a quality control sample, and blank should be prepared exactly as the sample was prepared.

- The detection of 100 $\mu g/L$ (or greater) of nitrate/nitrite should be cause for rejection of the lot of containers. **NOTE:** Contamination could be due to the container or the cap.

C. Preparation and Labeling

Sampling for environmental specimens requires that sample containers be transported to field sites prior to sample collection. As a result, considerable time may elapse between the receipt of sample containers and collection of the samples. Because of the large number of samples taken at any one site, accounting for all sample containers can become extremely difficult. The following guidance on the identification and tracking of sample containers is based on procedures that have been used successfully in the CLP bottle program.

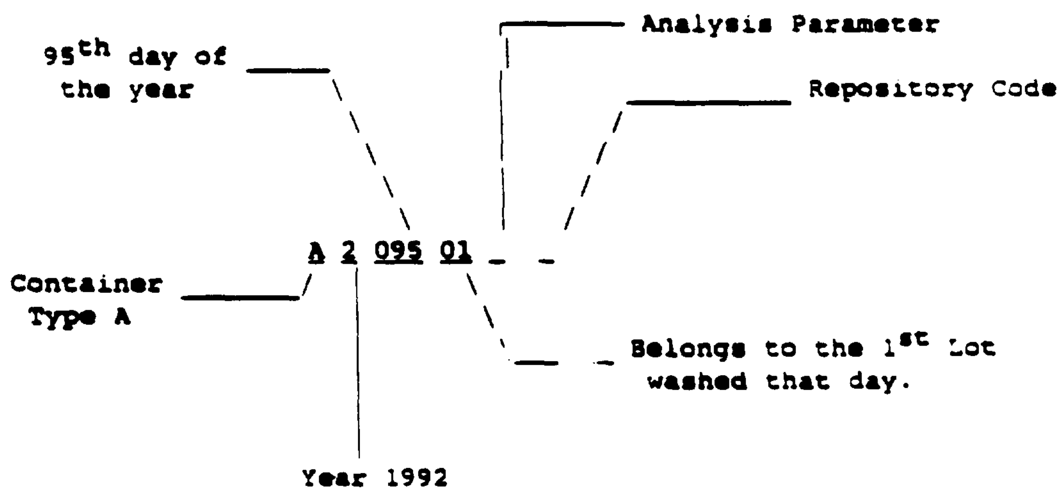
1. Each shipment should be inspected to verify that the requested number of cleaned and prepared sample containers have been supplied and meet the requirements specified in Section II (Tables 1 and 2). If any shipment fails to meet the required specifications, it should be discarded and replaced with a supply of sample containers that meet the required criteria.

2. The sample containers should be removed and prepared in accordance with the methods designated below.

3. A permanent nine-digit lot number should be assigned to each lot of sample containers for identification and tracking purposes throughout the life of the containers. Figure 2 provides an example of a lot number sequence.

FIGURE 2

LOT NUMBER SEQUENCE



a. The first digit represents the container type in Section II (Figure 1).

b. The second digit represents the last digit of the calendar year.

c. The next three digits represents the day of the year on which the sample containers were washed.

d. The sixth and seventh digits represent the daily lot number.

e. The eighth digit represents the analysis parameter where:

A = Semivolatile organics, pesticides, metals, cyanide, and fluoride;
B = Metals, cyanide, and fluoride;
V = Volatile organics;
S = Semivolatile organics and/or pesticides;
M = Metals;
C = Cyanide;
F = Fluoride; and
N = Nitrate/nitrite.

f. The final digit represents the identification of the person who prepared the lot.

4. The lot number for each container should be entered, along with the date of washing, type of container, and number of containers per lot, into the preparation/QC log book.

5. Lot numbers printed with solvent resistant ink on a nonremovable label should remain with the corresponding containers throughout the cleaning procedure.

6. After sample container cleaning and drying, the label should be affixed to the containers in a permanent manner.

7. At least one face should be clearly marked, excluding the top and bottom faces, of each case of sample containers with the assigned lot numbers.

TABLE 3

STANDARD MIXTURES OF ORGANIC COMPOUNDS TO VERIFY SENSITIVITY

Volatiles	Semivolatiles	Pesticides
Methylene Chloride	Nitrobenzene	Gamma-BHC
Acetone	4-Chloroaniline	Heptachlor
2-Butanone	2,6-Dinitrotoluene	Aldrin
Trichloroethene	Diethylphthalate	Dieldrin
Toluene	4-Bromophenyl-phenylether	Endrin
	Hexachlorobenzene	4,4'-DDT
	Pentachlorophenol	Aroclor 1260
	Di-n-butylphthalate	
	bis(2-Ethylhexyl)phthalate	